VERY LATEST METHODS

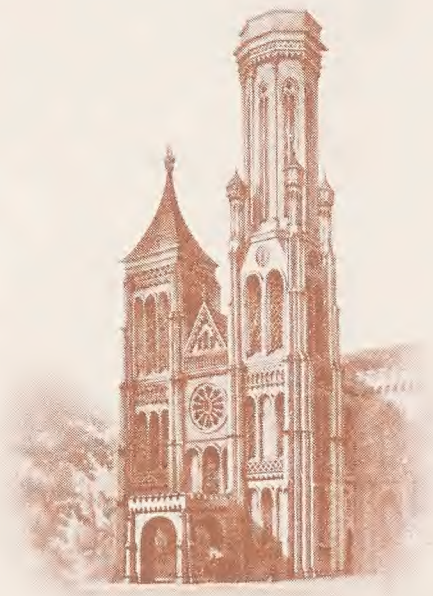
Special Formulas and Standard Processes

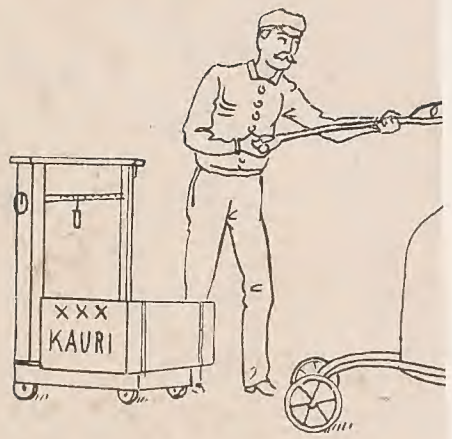
SECURED IN

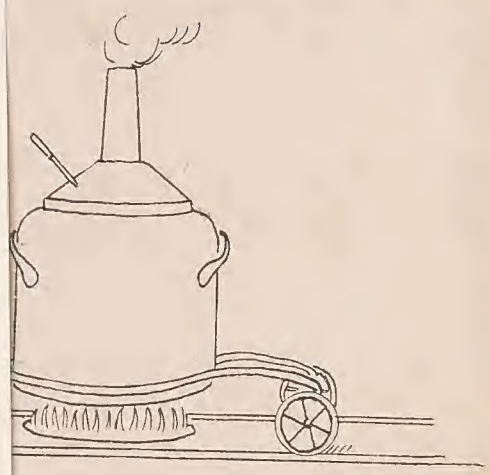
FRANCE, ENGLAND, BELGIUM AND GERMANY,

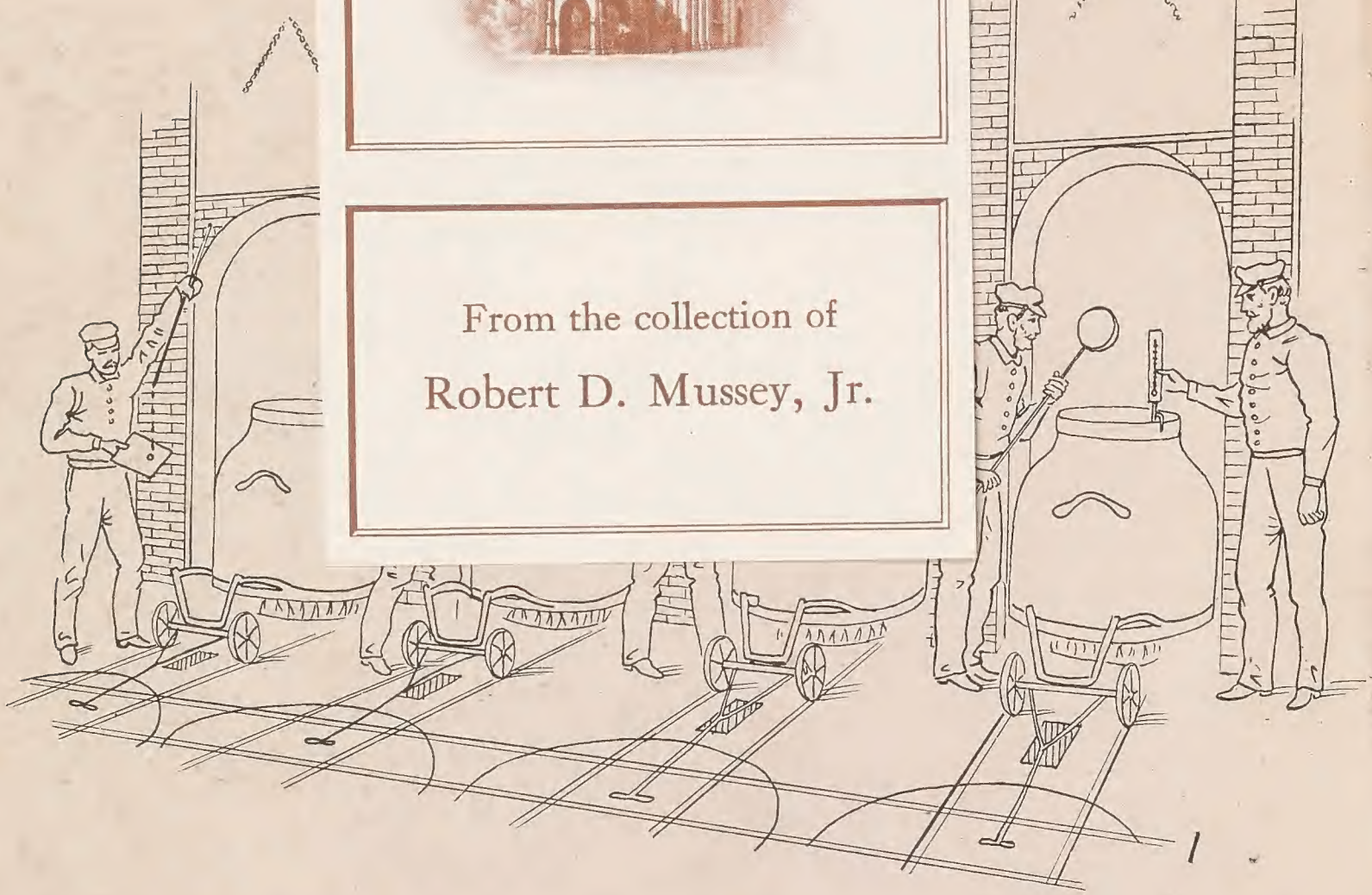
FOR THE MANUFACTURE OF

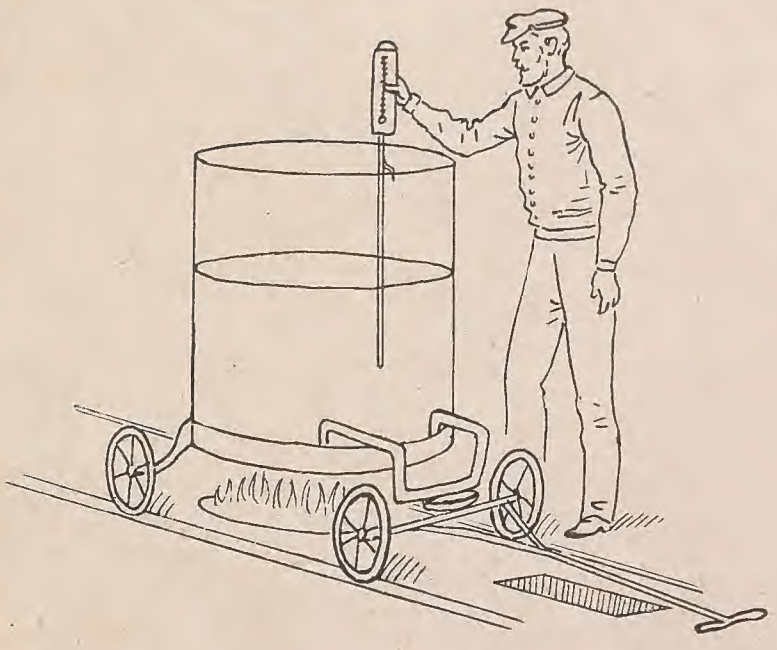
VARNISHES

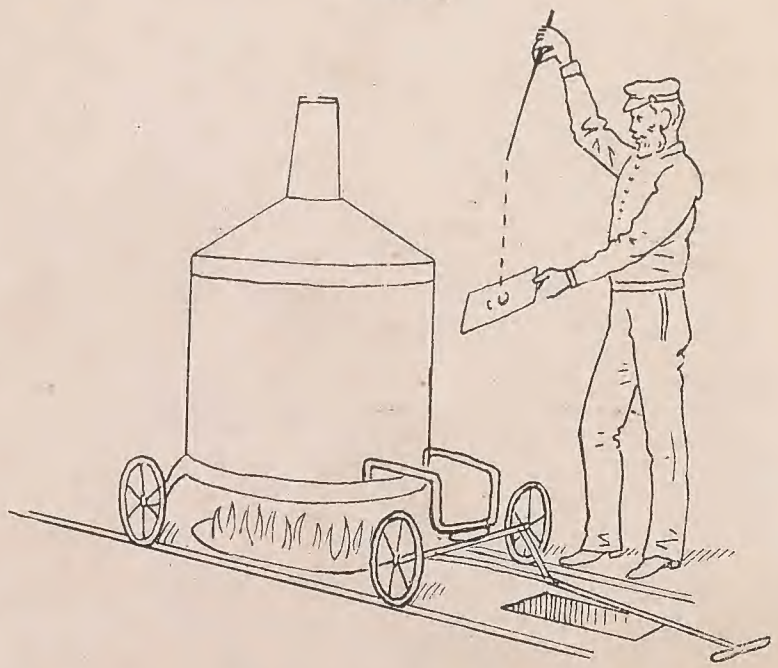


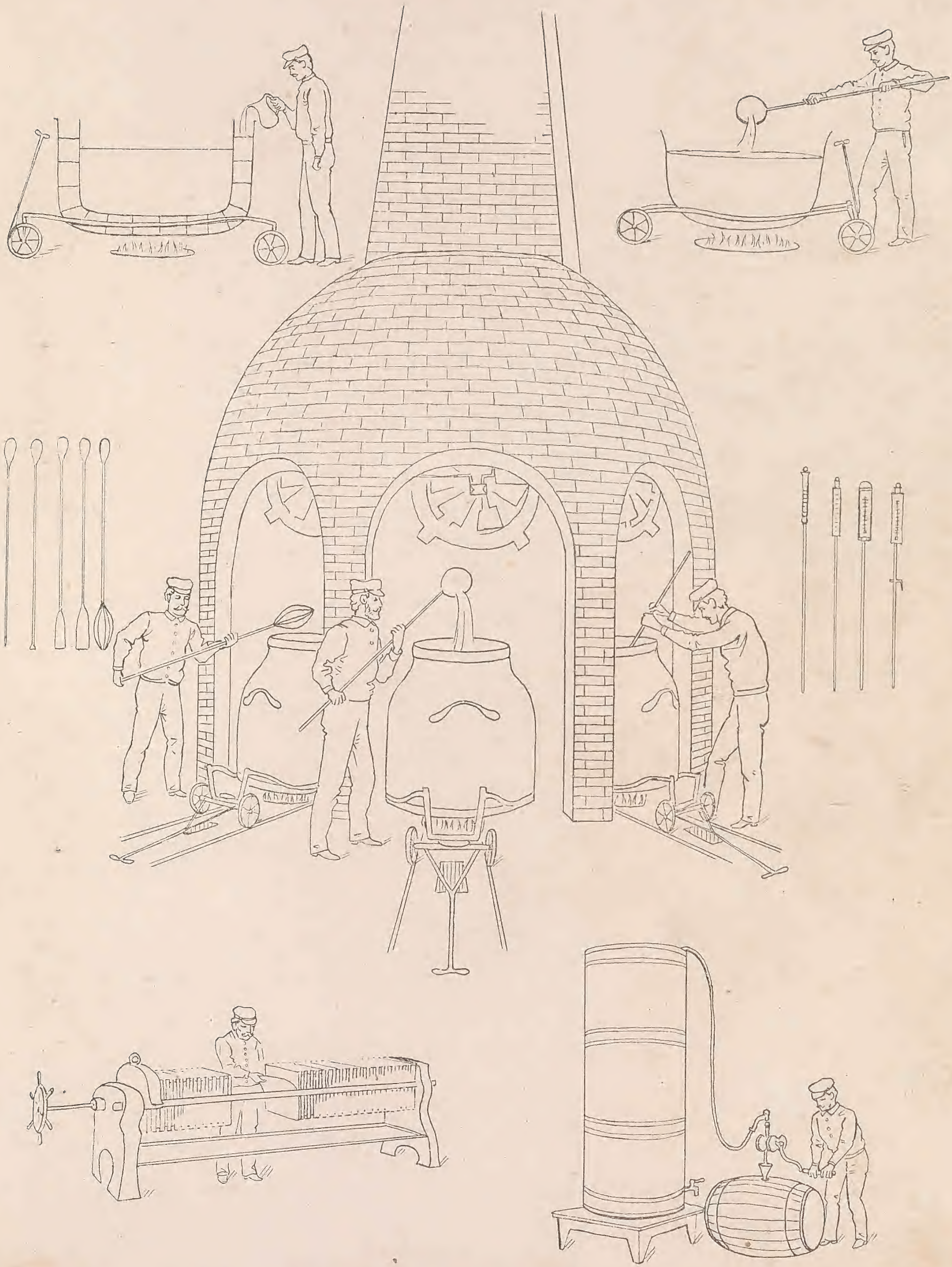


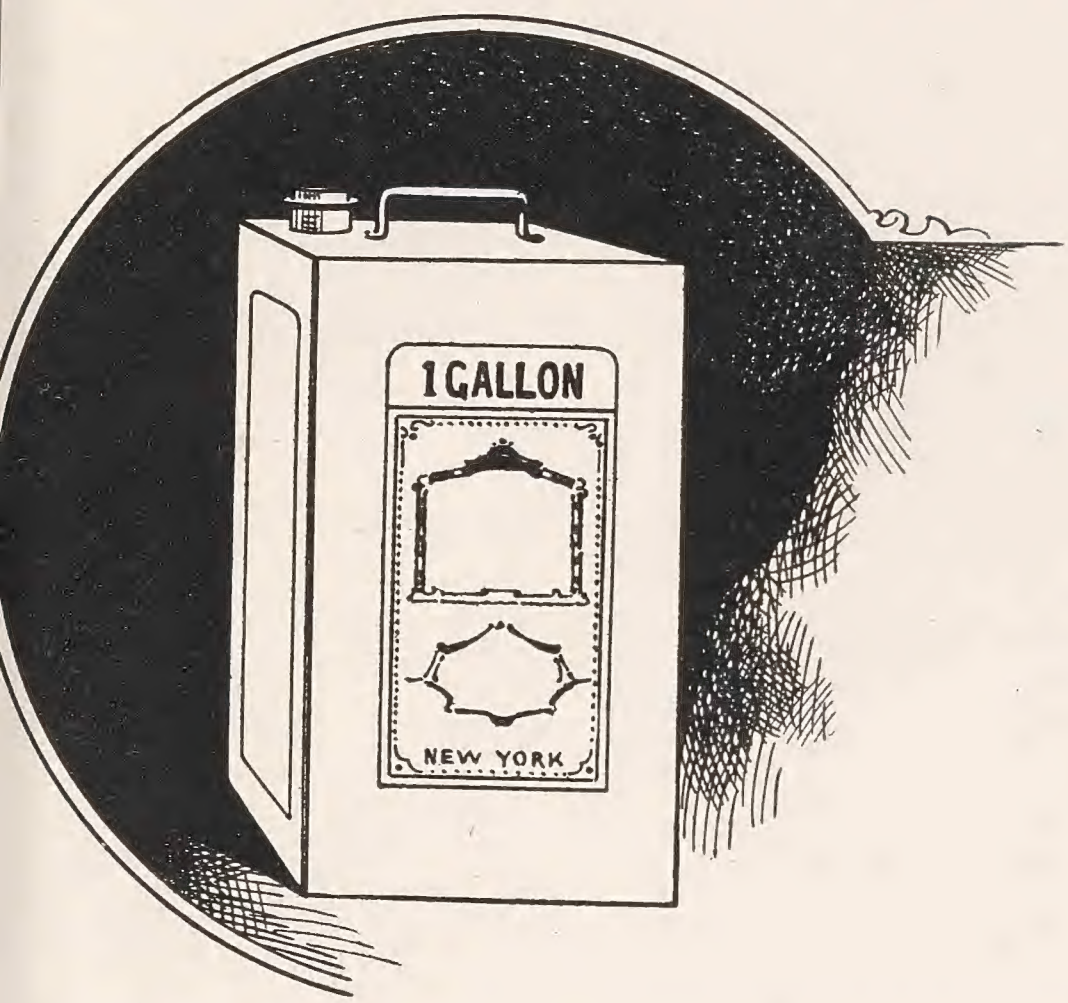












THE ART OF VARNISH MAKING.

-:-:-:-:-:-

I N S T R U C T I O N S :

Owing to the magnitude of this work, and the considerable space required for a thorough description and explanation of all the numerous processes adopted in MODERN VARNISH MAKING, reference will be often made to previous chapters, paragraphs, formulae or processes, so as to avoid repeating unnecessarily instructions already given at length.

Regarding the selection of ingredients such as VARNISH GUMS, the POINT OF FUSION, the best manner of BOILING, COOKING, OXIDIZING or THINNING DOWN, the operator will have simply to refer to the corresponding number of the formula or the heading of the Chapter, as per instructions which I have given in a manner as clear and concise as possible.

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););) THE ART OF MAKING VARNISHES. -:-:-

All questions bearing directly or indirectly upon THE PRACTICAL MANUFACTURE OF VARNISHES can be subdivided into TWENTY CHAPTERS:

1ST MANUFACTURE OF PREPARED OILS OR VARNISH OILS.

2ND MANUFACTURE OF WEARING BODY VARNISHES.

3RD MANUFACTURE OF HARD DRYING BODY AND FLOWING VARNISHES.

4TH MANUFACTURE OF RUBBING AND POLISHING VARNISHES.

5TH MANUFACTURE OF ELASTIC, TRANSPARENT & BAKING COPAL VARNISHES.

6TH MANUFACTURE OF FURNITURE VARNISHES AND COACH VARNISHES.

7TH MANUFACTURE OF AGRICULTURAL IMPLEMENT VARNISHES.

8TH MANUFACTURE OF OIL SHELLAC, WHITE AND HARD OIL FINISHES.

9TH MANUFACTURE OF DAMAR VARNISHES.

10TH MANUFACTURE OF BROWN, GOLD SIZE AND GRINDING JAPANS.

11TH MANUFACTURE OF ALL SORTS OF ROSIN PREPARATIONS.

12TH MANUFACTURE OF ALL SORTS OF LIQUID DRIERS.

13TH MANUFACTURE OF ALL SORTS OF LACQUERS AND VARNISH STAINS.

14TH MANUFACTURE OF WHITE AND ORANGE SHELLAC VARNISHES.

15TH MANUFACTURE OF LINSEED OIL SUBSTITUTES.

16TH MANUFACTURE OF SUBSTITUTES FOR GUMS AND RESIN GUMS.

17TH MANUFACTURE OF SUBSTITUTES FOR SOLVENTS AND DILUENTS.

18TH MANUFACTURE OF PRINTING INK AND LITHOGRAPHER'S VARNISHES.

19TH MANUFACTURE OF BAKING JAPANS, ASPHALTUM & BLACK VARNISHES.

20TH MANUFACTURE OF VARNISH SPECIALTIES.

-:-:-:-:-:-:-:-

The above standard grades can be modified into inferior qualities.

PART No.

(See Index on the next page.)

SUBJECT TREATED.

COMPLETE FORMULARY AND INSTRUCTION FOR THE PREPARATION OF

ALL SORTS OF DRYING OILS

ENTERING INTO THE MANUFACTURE OF FAT VARNISHES.

Part No. 1.

MANUFACTURE OF ALL SORTS OF PREPARED OILS

used in

M A K I N G F A T V A R N I S H E S .

-:-:-:-:-:-:-:-

-:-:-:-:-:-:-

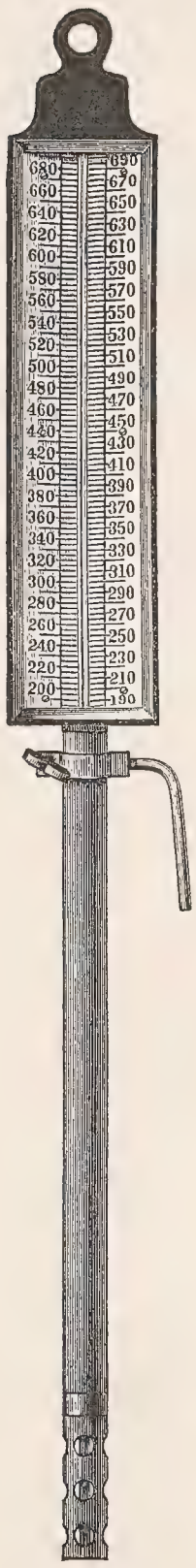
#10.

FORMULA, METHOD, PROCESS AND INSTRUCTIONS

FOR MAKING

B O R A T E O F M A N G A N E S E P R E P A R E D O I L.

-:-:-:-:-:-:-:-



Number 1 Borate of Manganese Oil.

In a single bottom kettle constructed as per instructions given in chapter No. 2 of THE SCIENCE OF VARNISH MAKING, put:

100 gals. of RAW LINSEED OIL.

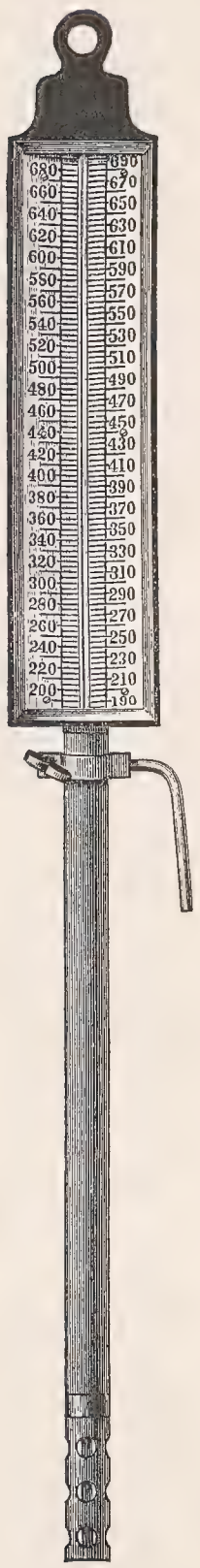
After having built an incandescent fire of coke perfectly well lighted and free from smoke or flames, carry your kettle over the fire place and heat the oil until your termometer indicates a temperature of 380 deg. F.

At this moment, watch the time and keep the Oil at the temperature of 380 deg. F. during four hours. On account of the intensity of the heat, remove your kettle about two feet from fire so as to get only radiated heat.

After four hours, let the oil cool to 250 deg. F., and add to it:

22 lbs. of BORATE OF MANGANESE.

The Borate of Manganese should not be put into the kettle, as it is done sometimes by Varnish makers. After the Borate of Manganese has been weighed accurately, the whole amount of 22 lbs. should be first put (dry) into a small copper kettle of about 25 gallons capacity, and treated there in the following manner:



Using a scoop of about one gallon capacity, some of the oil heated at 250 deg. F. into a large kettle should be gradually added under constant stirring to the dry Borate of Manganese which is placed in the small kettle; there the mixture should be kept under constant stirring until a thick and homogeneous paste is produced.

At first there is a violent effervescence produced as soon as the hot oil comes in contact with the Borate of Manganese; but this should be kept under constant stirring unti the effervescence is subdued.

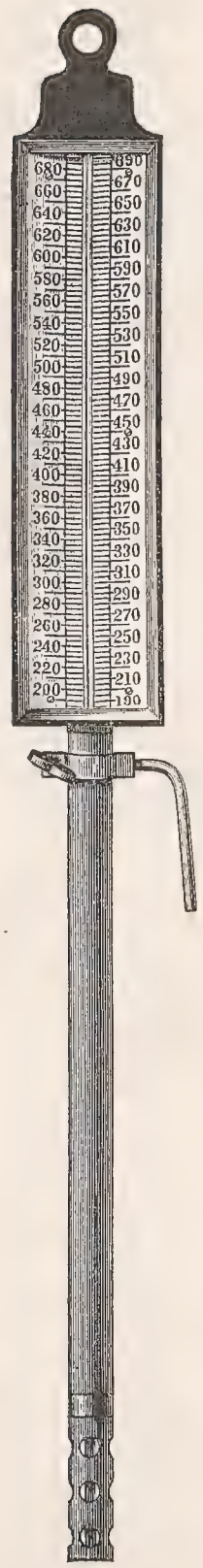
As soon as the Borate of Manganese forms with the Oil in the small kettle a perfectly homogeneous paste, free from lumps, the mixture should be carried into the large copper kettle containing 100 gals. of Oil already heated at 250 deg. F. Add the oxidizing compound gradually; when all is in it, raise the temperature up to 475 deg. F. until the chemical is all taken up, then put in tank, and allow to settle for a week before using.

No. II, B O R A T E O F M A N G A N E S E O I L.

Heavier in Body and Quicker Drying

than NO. I OIL.

-:-:-:-:-:-:-:-:-



Use the same kind of kettle and follow the same instructions given in FORMULA NO. I, for the management of the fire.

Instead of using 22 lbs. of Borate of Manganese as the previous formula calls for, use:

26 lbs. of BORATE OF MANGANESE.

Carry your kettle over the fire-place and heat the oil until your thermometer indicates a temperature of 400 deg. Fah.

At this moment watch the time and keep the oil at the temperature of 400 deg. F. for five hours.

The 26 lbs. of Borate of Manganese should be added to the oil while this has been allowed to cool down to 275 deg. Fah.

Same instructions as to the manner in which the Borate is to be added; and when it is all "taken up", heat the oil up to 500 deg. Fah.; then allow to settle and clarify, or better yet, filter thoroughly before using.

#30.

NO. III. BORATE OF MANGANESE OIL.

French Formula and Process.

EXCEEDINGLY LIGHT IN COLOR.

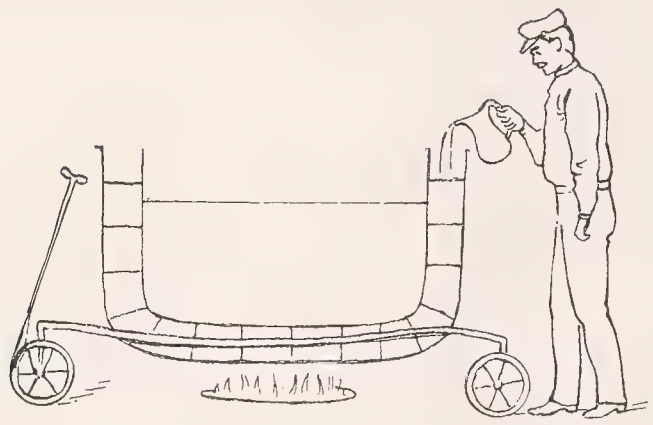
-:-:-:-:-:-:-:-:-

The day before preparing this Borate oil, it should be previously heated in a steam jacketed copper kettle to a temperature of 210 deg. F. for about one hour and allowed to cool down over night. The object of this is to produce a previous bodying of the oil before treating it with the Oxidizing Agent.

The day after the same operation should be repeated; and before the oil is removed from the steam jacketed kettle, it should be heated again to a temperature of 210 deg. F. and kept to this point for an hour or so.

It is only after the Oil has been thus treated that it is sent into the double copper kettle, where it is prepared by the MELTED METAL HEATING PROCESS.

The 100 gallons of Oil having been treated as per instructions in the previous page, are then placed in the double kettle, which is already heated uniformly from top to bottom by the melted Lead which surrounds it. The melted Lead insures at once a



heat of 560 deg. F. Leave your kettle on fire with the oil in it for at least four hours, then remove it from fire; let the oil cool down to 300 deg. F., and at this moment add to it only the amount of

10 lbs. of BORATE OF MANGANESE.

Follow the instructions already given in Formula No. 1 for preparing the paste of Manganese and Oil before sending it into the large kettle. When all the Manganese Borate has been added to the Oil, carry your kettle again over the fire until the uniform temperature of 560 deg. is obtained.

Keep the kettle on fire one hour longer.

At this stage there will be an intense bodying and oxidizing of the Oil produced, while this oil will be almost bleached instead of being dark, or yellowish, as per ordinary process. Varnish formulae will call for this Oil later On.

#40.

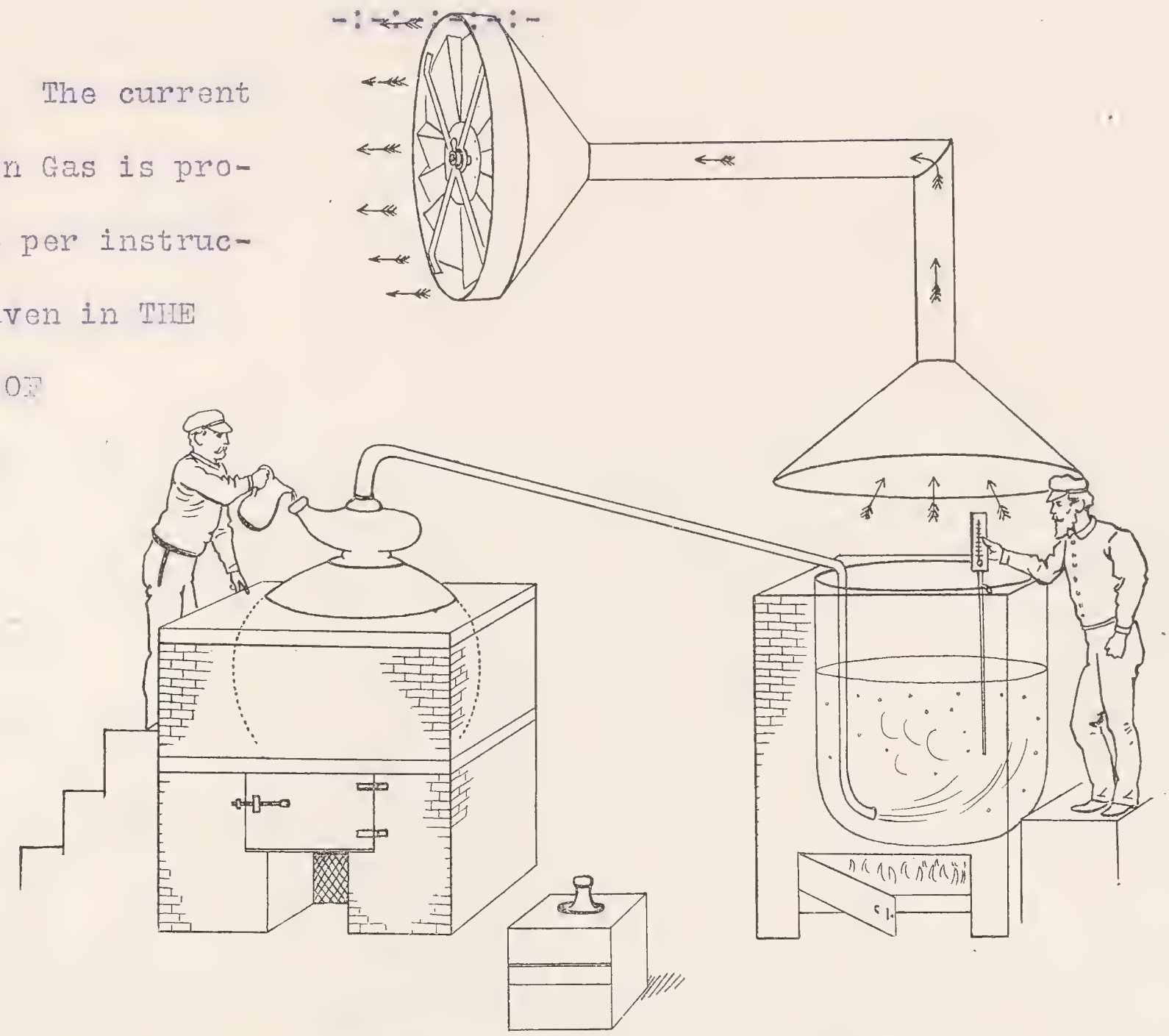
NO. IV OIL.

M A D E F R O M B O R A T E O F M A N G A N E S E.

combined with

THE OXIDIZING ACTION OF A CURRENT OF OXYGEN GAS.

The current of Oxygen Gas is produced as per instructions given in THE SCIENCE OF VARNISH MAKING.



Put in your stationary kettle 200 gallons of BLEACHED OIL; raise the temperature to 300 deg. F.; keep at this point for five hours, then add gradually 15 lbs. of BORATE OF MANGANESE, as per instructions already given in formula for making Oil No. 1.

Produce a current of oxygen by using in the retort 25 lbs. of Peroxide Of Manganese and 12 lbs. of Sulphuric Acid 66 deg. Raise the temperature to 450 deg. F., then tank and let settle for a

#50.

NO. V OIL.

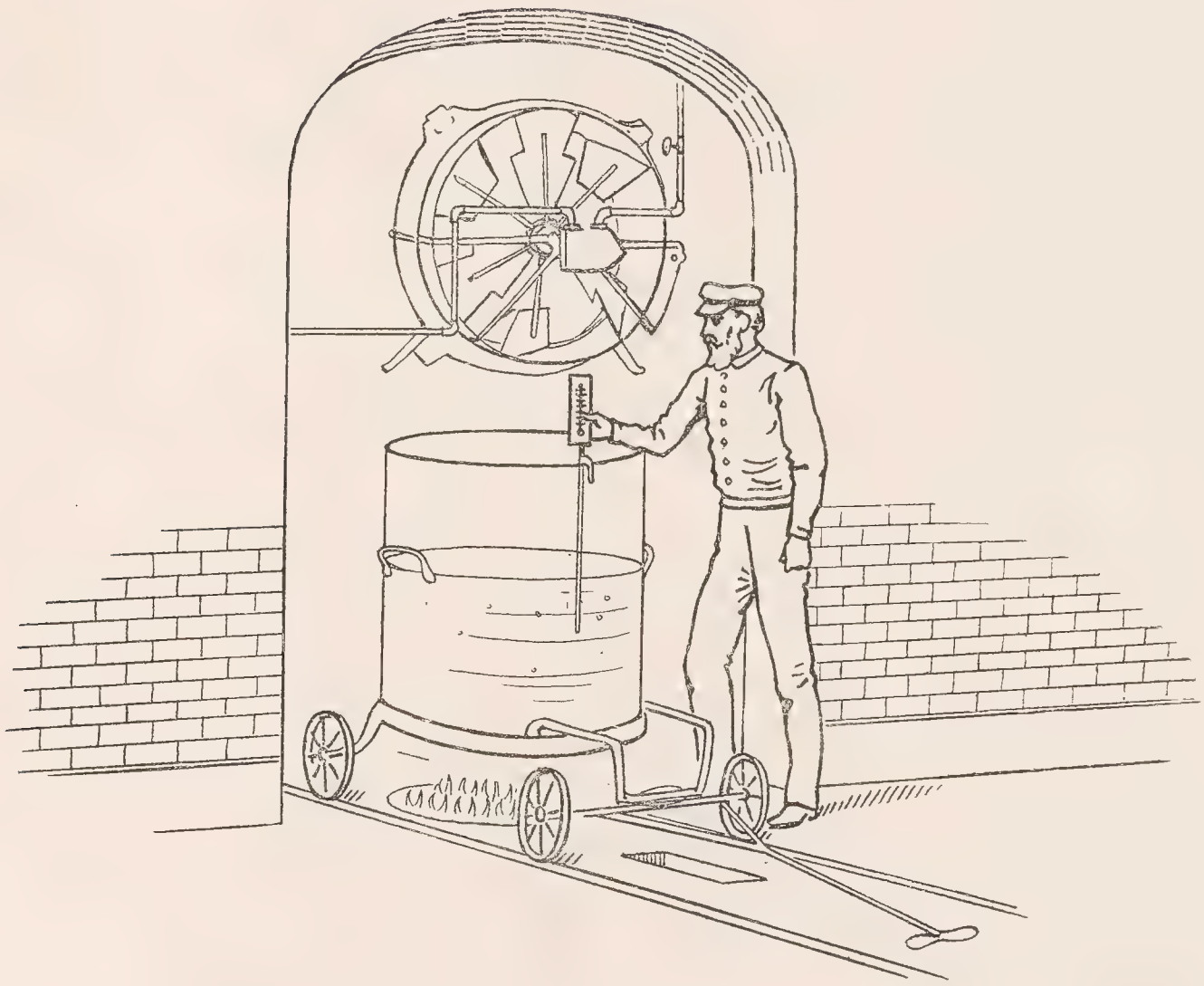
M A D E F R O M O L E A T E O F M A N G A N E S E .

instead of

B O R A T E O F M A N G A N E S E .

-:-:-:-:-:-:-

Conduct the operation exactly as per instructions given



for making Prepared Oil No. 1; but instead of using 22 lbs. of Borate of Manganese, use:

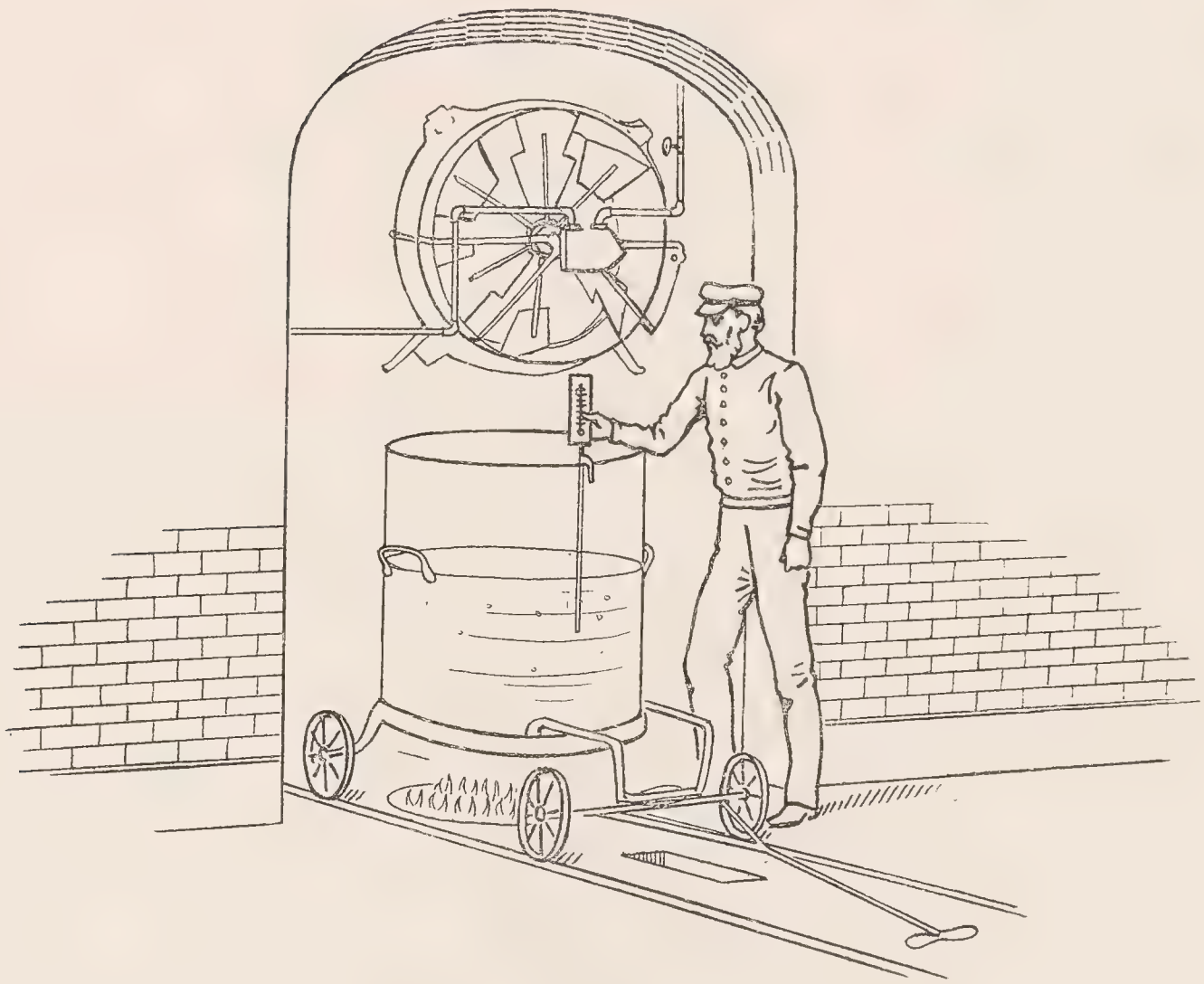
45 lbs. of OLEATE OF MANGANESE.

Oleate of Manganese is entirely soluble in Oil without residue.

#60.
NO. VI OIL.

MADE FROM GRANULATED MANGANESE AND CAUSTIC SODA.

Heat 100 gallons of oil in your copper kettle up to



220 deg. F.; then add gradually and under constant stirring:

1 lb. of CAUSTIC SODA.

As soon as the froth is subdued raise the temperature to 350 deg. F.; then draw the kettle three feet from fire; allow to cool down to 275 deg. F. At this moment add gradually and under constant stirring:

30 lbs. of GRANULATED MANGANESE.

Increase the heat to 450 deg. F.; allow to cool, settle and clarify perfectly before using; use only after three weeks.

This oil is quick drying and sets quite hard.

#70

NO. VII OIL.

M A D E F R O M O X I D E O F M A N G A N E S E

A N D S A L A M M O N I A C .

-:-:-:-:-:-:-

By following punctually the instructions of this formula a very fine drying oil will be the result. You must proceed as follows:

Into a 300 gal. iron Varnish kettle, mounted on truck and such as used generally in Varnish factories for making driers

and Japans, place 100 gals. of CALCUTTA LINSEED OIL or BLEACHED LINSEED OIL. Raise the temperature up to 480 deg. F. ; maintain to this point for about one hour. Then allow to cool to 225 deg. F. At this moment add, under constant stirring, a mixture of 20 lbs. of OXIDE OF MANGANESE and 1 1/2 lbs. of Sal Ammoniac intimately incorporated. Subdue the froth. Increase the heat to 250 deg. F. Allow this temperature for about five hours. Then take kettle from fire. Send the oil into a cooling vat and keep it a week before using.

#80.

NO. VIII OIL.

M A D E F R O M R E D L E A D A N D L I T H A R G E

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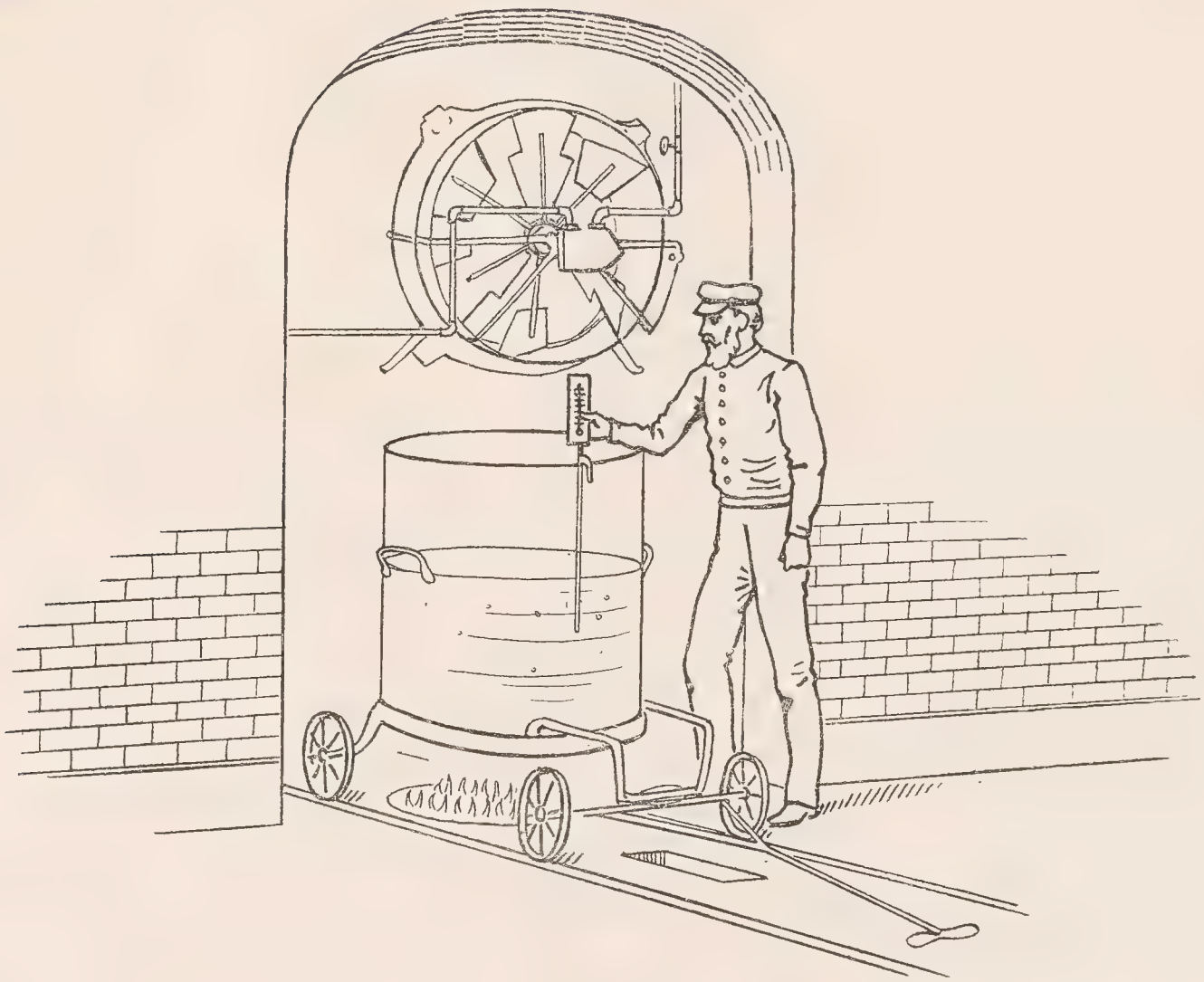
Put in your Varnish kettle 100 gals. of RAW LINSEED OIL. Raise the temperature to 275 deg. F.; then take the kettle from fire.



At this moment put in it gradually and under constant stirring, 33 lbs. of Red Lead. Subdue the froth which is produced; then carry the kettle over the fire place and increase the heat up to 350 deg. F. until the,Red Lead has been taken up.

Remove kettle from fire. Allow to cool to 250 deg. F.; then put in it in the same manner, 33 lbs. of Litharge; increase

the heat until the thermometer indicates a temperature of 300 deg. F. Be very careful not to heat over this point, as otherwise the contents of the kettle will raise so rapidly that it would boil over. Subdue the froth quickly as soon as it is produced. Then raise the temperature gradually to 400 deg. F. Keep at this temperature a couple of hours longer; then remove the kettle from fire send the contents to cooling vat and allow to settle for at least one week before using.

-:-:-:-:-:-:-

#90.

OLEATE OF LEAD OIL NO. IX.

A very powerful oxidizing agent is Oleate of Lead. Unlike Red Lead or Litharge, it is almost immediately taken up by an oil heated at 300 deg. F. without being necessary to prolong the "COOKING" in the kettle for more than a couple of hours.

To make a "BATCH" of Oleate of Lead oil, place in an ordinary copper kettle 100 gals. of Refined Linseed Oil. Raise the temperature until the thermometer indicates 300 deg. F. Then add to it very slowly and under constant stirring:

15 lbs. of Oleate of Lead.

Raise the temperature up to 400 deg. F.; keep at this point for a couple of hours, then allow to cool and clarify.

#100.

NO. X OIL.

A L S O C A L L E D F U R N I T U R E O I L .

MADE FROM SUGAR OF LEAD, RED LEAD AND UMBER.

-:-:-:-:-:-:-:-

This Oil, also called Furniture Oil, is quick drying and largely used in the manufacture of either COACH or FURNITURE VARNISHES.

FORMULA:

Raw Linseed Oil - - - - - - - - - -	100 gals.
Sugar of Lead - - - - - - - - - - - -	50 lbs.
Red Lead - - - - - - - - - - - - - - -	30 "
Turkey Umber - - - - - - - - - - - - -	8 "

INSTRUCTIONS:

Heat the Oil to 300 deg. F. At this temperature draw kettle from fire and add first the Sugar of Lead; stir thoroughly unti it is all taken up by the oil and all froth has been subdued.

Put your kettle on fire again; heat up to 325 deg. F.; and keep at this temperature for fifteen minutes.

Now add the Red Lead gradually; subdue the froth; raise the temperature up to 470 deg. f.; add the Turkey Umber and cook for four hours at 485 deg. F. Take from fire and allow to clarify.

#110.

NO. XI OIL.

A L S O C A L L E D H A R D U M B E R O I L .

MADE FROM UMBER AND OLEATE OF LEAD.

-:-:-:-:-:-:-

This Oil dries Hard, although not so hard as the RUBBING POLISHING HARD OIL, the formual of which will be given further on.

It finds several applications in special grades of Coach Varnishes.

FORMULA:

Raw Linseed Oil - - - - - - - - -	100 gals.
Lead Oleate - - - - - - - - - - -	10 lbs.
Turkey Umber - - - - - - - - - -	28 "

INSTRUCTIONS:

Heat the Linseed Oil up to 300 deg. F. Take kettle from fire; add to the oil first the Lead Oleate. When all has been taken up by the oil, bring your kettle on fire again. Heat up gradually to 450 deg. F.; then take your kettle from fire and add to it the 28 lbs. of Turkey Umber. Maintain at this temperature for about three hours; then allow to cool and clarify.

Oleate of Lead can be had from Dr. Hohn & Co., chemische fabrik, Dusseldorf, Germany.

#120.

NO. XII OIL.

A L S O C A L L E D F I N I S H I N G O I L .

MADE FROM UMBER, SUGAR OF LEAD, RED LEAD, LITHARGE, LEAD OLEATE.

-:-:-:-:-:-:-:-

Another good formula largely used by Varnish makers for preparing an Oil intended to be mixed with Hard Gum in the proportion of six or seven gallons per 100 lbs. is the following:

FORMULA:

Raw Linseed Oil - - - - - - - - -	100 gals.
Lead Oleate - - - - - - - - - - -	10 lbs.
Litharge - - - - - - - - - - - - -	8 "
Red Lead - - - - - - - - - - - - -	12 "
Sugar of Lead - - - - - - - - - -	30 "
Turkey Umber - - - - - - - - - -	12"

INSTRUCTIONS:

The Turkey Umber should be freshly calcined, or better yet, just calcined before putting it into the kettle.

The chemicals should be put in as follows: First, the Lead Oleate while the Oil is at 300 deg. F.; then raise the temperature to 450 deg. F., and add successively the Litharge, Red lead, Sugar of Lead and Turkey Umber, as per instructions already given. Allow to cool and clarify.

#130.

NO. XIII OIL.

E X T R A H A R D R U B B I N G P O L I S H I N G O I L

SO AS TO RUB IN 28 HOURS AND POLISH IMMEDIATELY AFTER.

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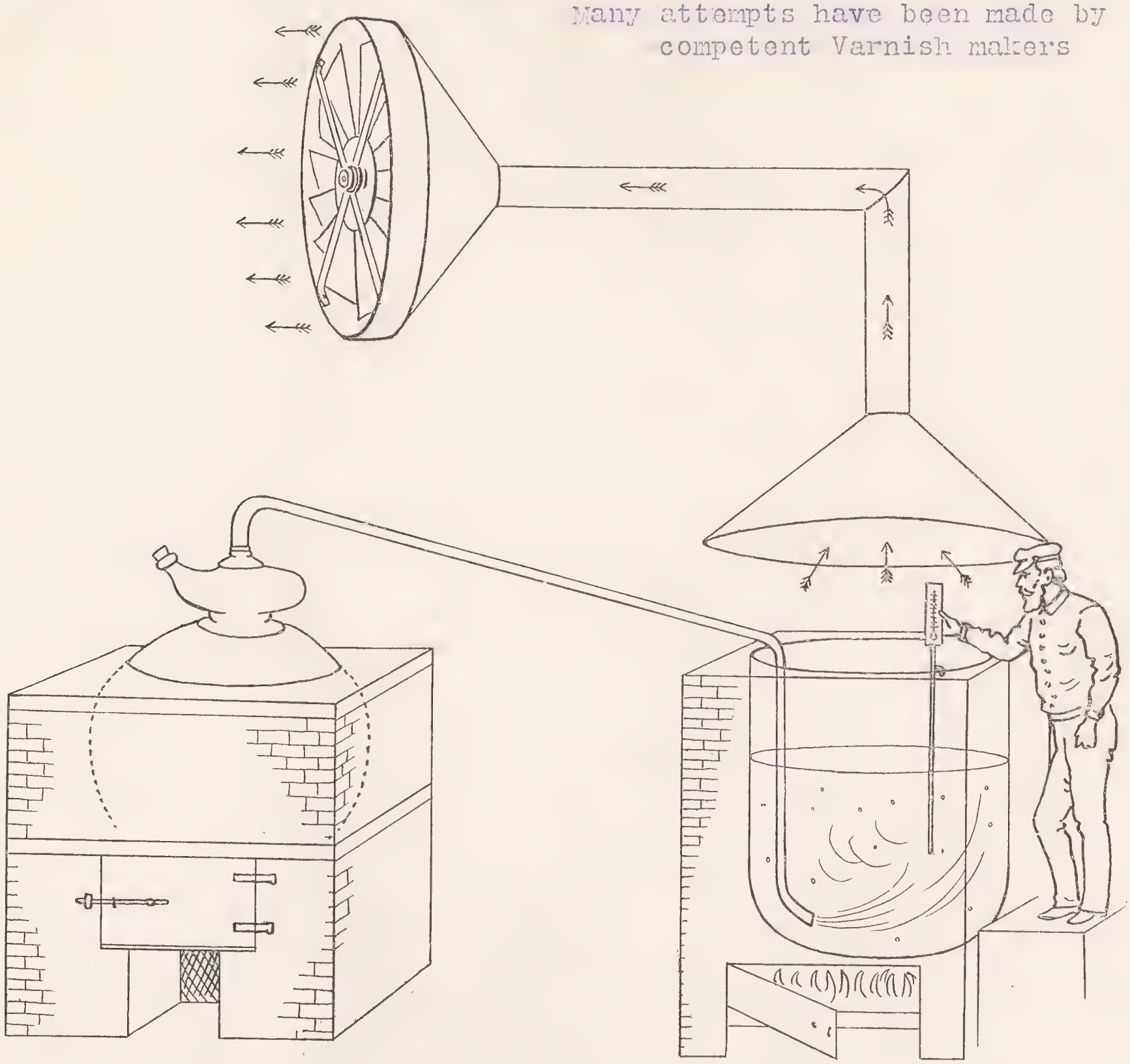
Many attempts have been made by competent Varnish makers

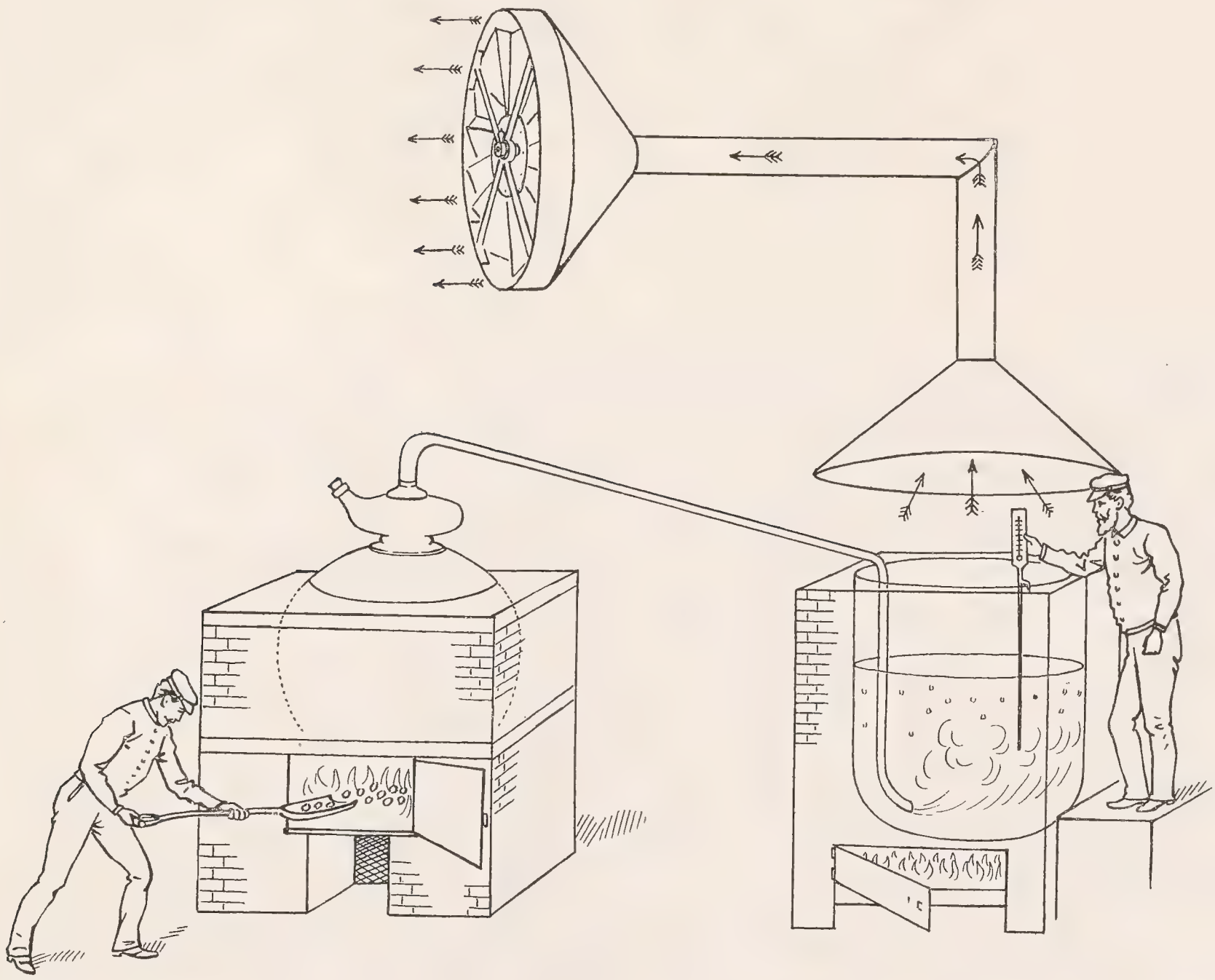


to produce from Raw Linseed Oil, and without the use of gum, a Prepared Oil intensely oxidized to a far greater extent than it is possible to accomplish by the usual method of the ordinary single bottom copper kettle and the combined action of the most powerful oxidizing chemicals. The arrangement as per above cut, can only

enable to produce the most intense oxidizing which is required for obtaining from Raw Linseed Oil a result such as already specified.

Use the same formula given in No. XII oil and intensify the oxidizing action of Lead Oleate, Litharge, Red Lead, Sugar of Lead and Turkey Umber by a current of pure oxygen gas produced as per instructions given in chapter XIII on the subject of Oxidizing Oils. (See that chapter in the Science of Varnish Making.)

The additional amount of oxygen which is dissolved or taken up by the oil can only produce the desired result. It is absolutely impossible to accomplish this result in the ordinary copper kettle resting upon an incandescent fire of coke.



Borate of Manganese Oils cannot produce the same result, no matter how much Borate has been used.

A comparatively quick drying oil can be made from Manganese Borate, quite light in color, drying satisfactorily; but DRYING SOFT.

It is a peculiarity of Lead Oxide to make oil dry Hard.

#140

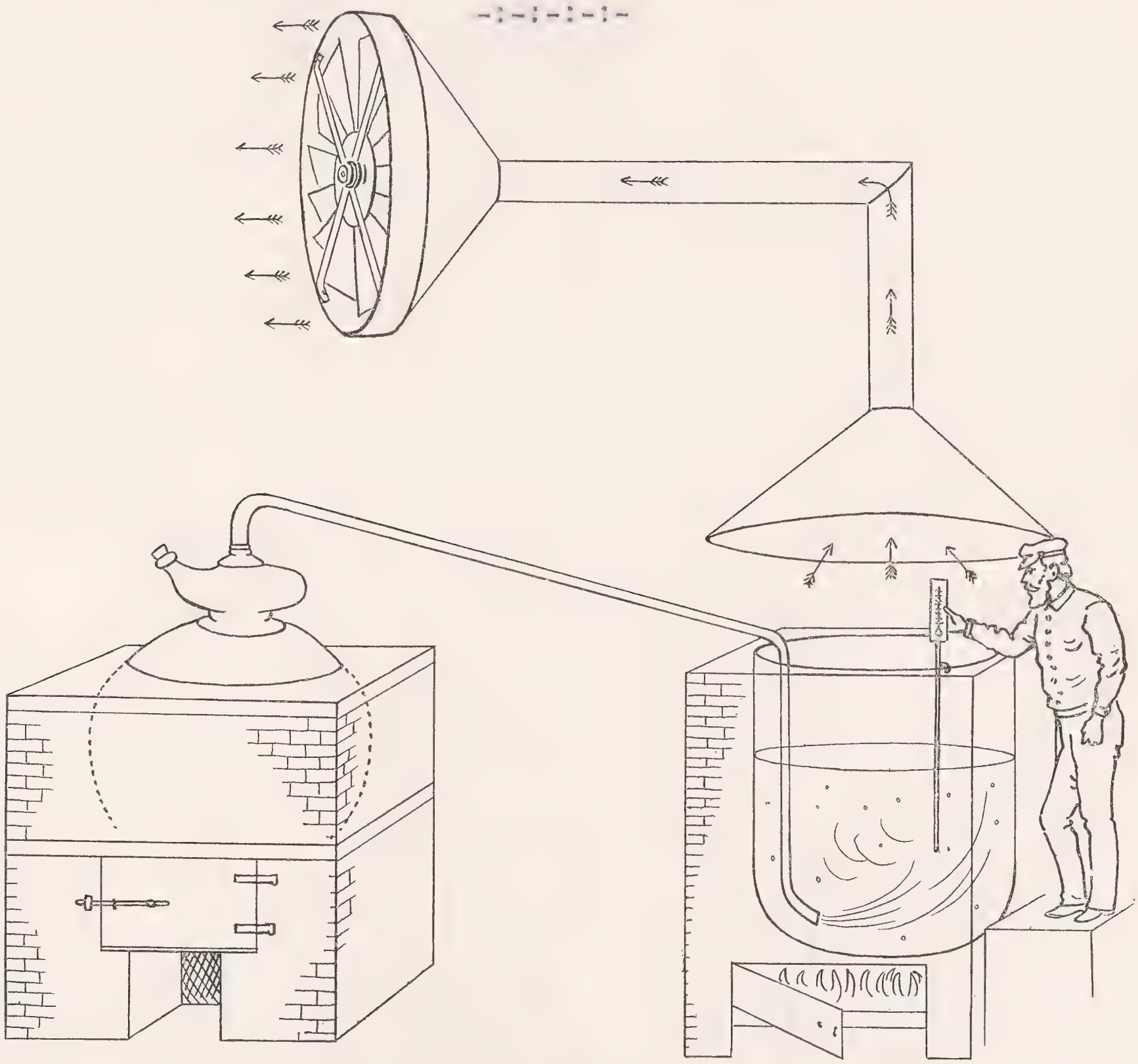
NO. XIV OIL.

MADE FROM BORATE OF MANGANESE AND PURE OXYGEN GAS:

also called

L I T H O G R A P H E R S ' H E A V Y B O D Y O I L .

-:-:-:-:-



After having made the No. III BORATE OF MANGANESE OIL exceedingly light in color, as per French Formula and Process described, if this oil is placed in a stationary kettle, heated to 300 deg. F. and submitted to a current of oxygen gas, as per above cut, during three hours, the result will be an oil exceedingly light in color and almost as thick as gelatine.

#150.

S E C O N D A R Y V A R N I S H O I L S

OF FREQUENT USES AND APPLICATIONS IN VARNISH MAKING.

-:-:-:-:-:-:-;-

Aside from the twelve different formulae and processes for the manufacture of what may be called "THE STANDARD PREPARED OILS" of the Varnish maker, there are some other formulae for the production of special Varnish Oils having a secondary importance but worthy of being mentioned in this formulary. Amongst these Special Oils are the following:

We give merely the formula and the name by which the factory man designates them; the commercial name of the article being generally a proprietary one.

CABINET OIL - - - - - - - - made from Raw Linseed Oil 100 gallons, Red Lead 35 lbs., Litharge 10 lbs. and Turkey Umber 10 lbs.

QUICK BODY OIL - - - - - -made from Linseed Oil 100 gals., Borate of Manganese 12 lbs. and Litharge 8 lbs.

OIL CLOTH ELASTIC OIL - - made from Raw Linseed Oil 100 gallons, Lead Oleate 8 lbs. and Oleate of Manganese 8 lbs.

OIL FOR OIL SHELLAC - - - made from Raw Linseed Oil 100 gallons and Red Lead 16 lbs. Heat up to 450 deg. F. Allow to cool down to 300 deg. F.; then add Litharge 16 lbs.; give three heats and finish the operation at 475 deg. F. after a COOKING at least of six hours from the beginning of the operation.

PREPARED OIL FOR WIRE SCREEN VARNISH - - - This Oil is not made from chemicals directly; it is generally the result of a mixture of 50 per cent of OIL CLOTH ELASTIC OIL and 50 per cent of HARD UMBER OIL described in formula for making No. XI Oil.

By mixing an Elastic Oil with a Hard Oil, the result can be modified to such an extent that it is only a question of proportions to graduate the elasticity or the hardness of the finished product according to the requirements of the Varnish with which the Oil is to be associated. Therefore, it is not necessary for a Varnish maker to carry in stock twenty different kinds of Oil; only four sorts are necessary; first, a VERY ELASTIC OIL; second, A HARD DRYING OIL; third, a VERY LIGHT OIL; fourth, a QUICK DRYING OIL.

PART No. II

(See Index on the next page.)

SUBJECT TREATED.

COMPLETE FORMULARY AND INSTRUCTIONS FOR MANUFACTURING

ALL SORTS OF

W E A R I N G B O D Y V A R N I S H E S.

Part No. II

COMPLETE FORMULARY AND INSTRUCTIONS FOR MANUFACTURING

ALL SORTS OF

W E A R I N G B O D Y V A R N I S H E S .

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W E A R I N G B O D Y Z A N Z I B A R .

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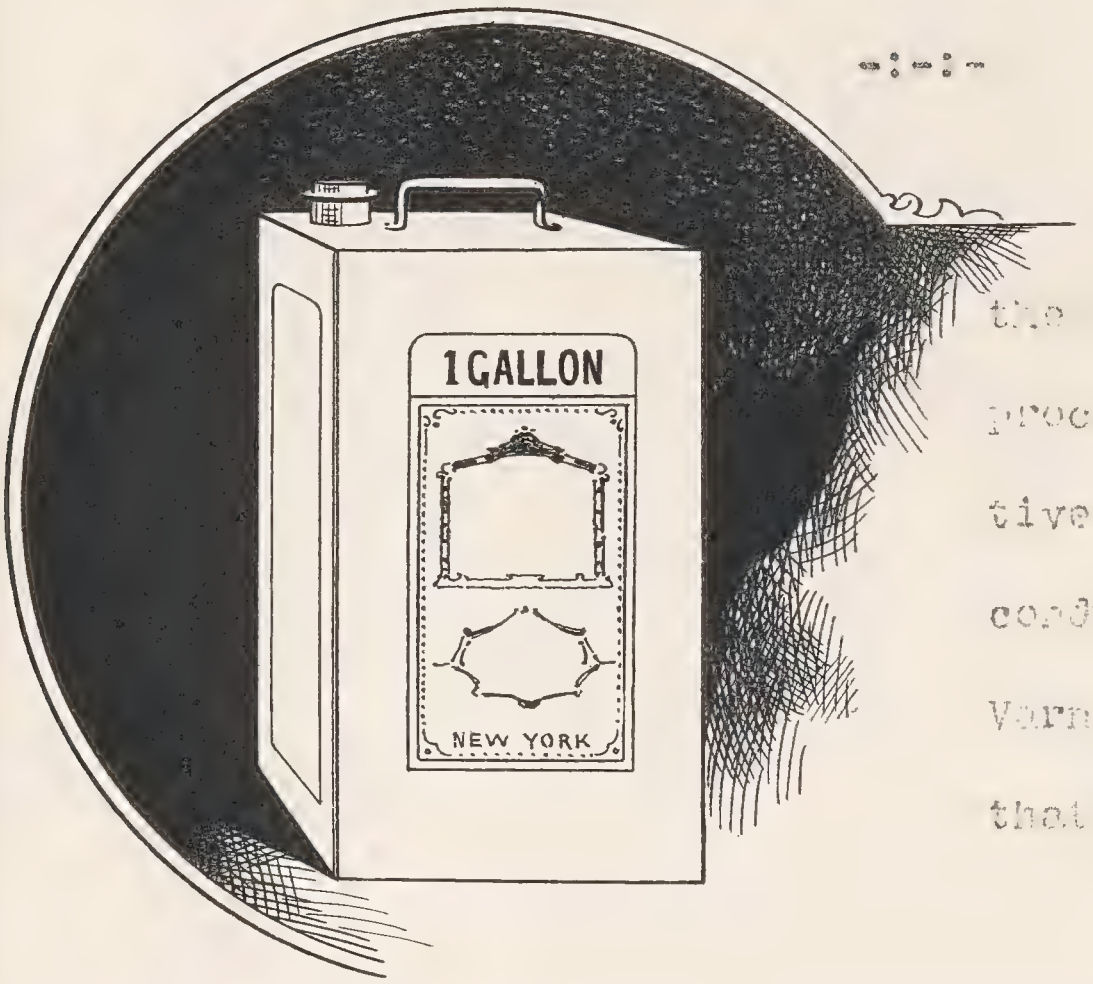


By following punctually the instructions given in this process and formula, the operative varnish maker, capable of conducting a good "BATCH" of Varnish will obtain a result that cannot be improved.

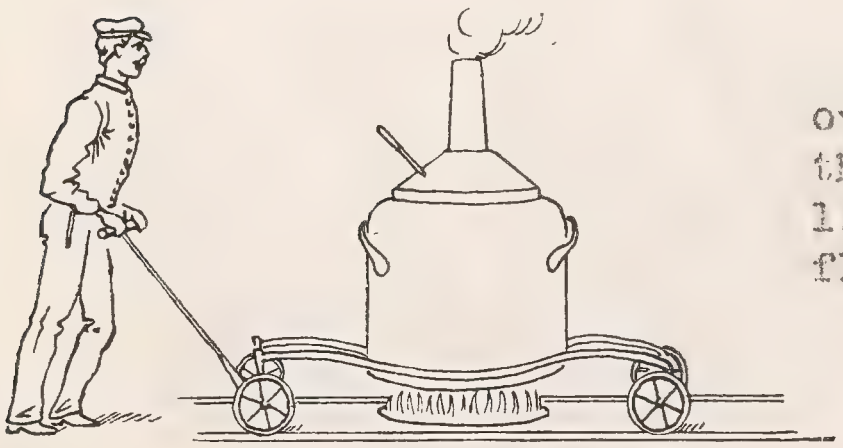
INSTRUCTIONS:

FIRST OPERATION.

WEIGH ACCURATELY

100 lbs. of ZANZIBAR PALE A, which is also known under the name of "Palo Sorts". The price of this Gum is comparatively very high, but the product obtained from it commands a price which leaves a good margin of profit. $6.00 per gallon is the retail price.

SECOND OPERATION.



Carry your kettle and contents over the fire-place; be sure first that the coke fire is perfectly well lighted and absolutely free from flames.

THIRD OPERATION:

The melting must be done as rapidly as possible. Use the iron stirrer briskly so as to help the melting.

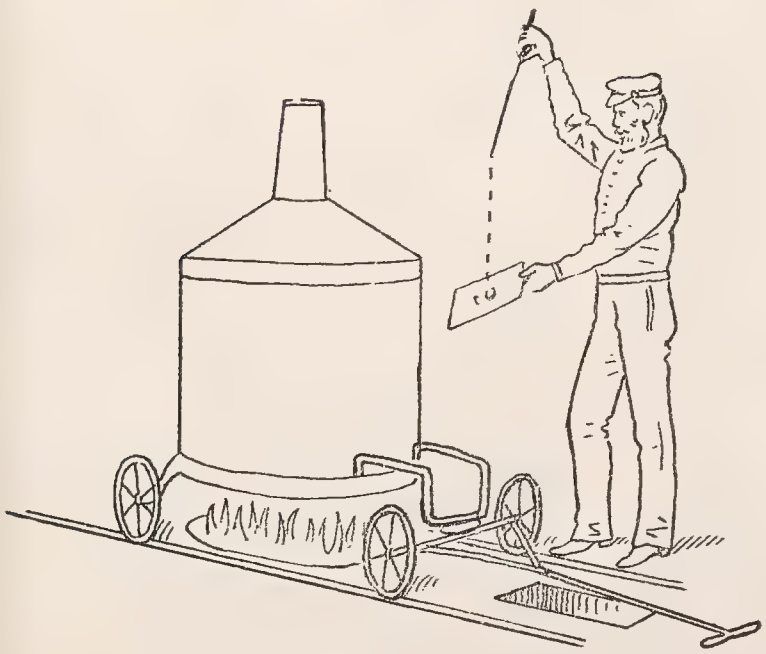
The POINT OF FUSION of Zanzibar, highest grade, is 482 deg. F.; it is necessary, to insure good results, not to heat above 525 deg. F.

FOURTH OPERATION:

As soon as the last lump of Zanzibar has been liquified, leave the kettle on fire long enough to permit the volatilization of dampness.

If the fire is well conducted, the furnace properly working, and the draught continuous, it should not take more than fifteen minutes to eliminate the dampness and what is called resinous fumes.

FIFTH OPERATION:



As soon as the Zanzibar Gum has been perfectly melted and no fumes noticeable at the end of the hood placed over the top of the cover, try with the iron stirrer the degree of fluidity of the liquified Zanzibar and if it is in a proper condition to receive the oil.

SIXTH OPERATION:

It would be a great mistake to use a LEAD OIL in the manufacture of WEARING BODY ZANZIBAR VARNISH of the highest grade. The best oil to use in a Varnish of this kind should possess a great deal of elasticity combined with lightness of color and quick drying property.

While your kettle is on fire, heat separately in the iron steam jacketed kettle, 25 gals. of Oil No. III, made as per French Formula and process described in the previous chapter.

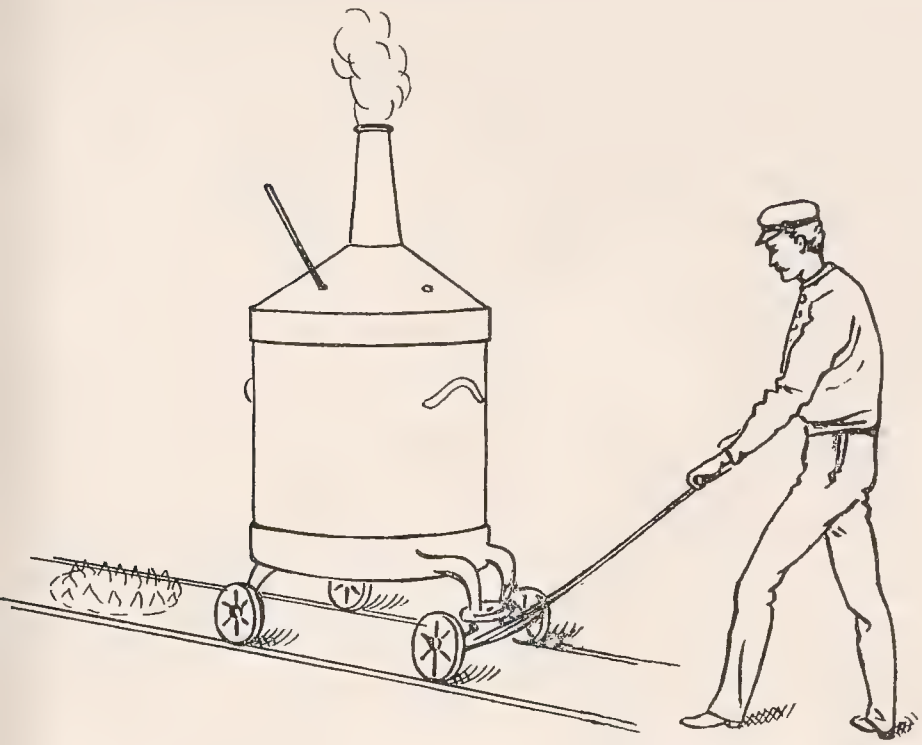
SEVENTH OPERATION:

While the kettle containing the liquified Zanzibar is still over the fire place, add to it, using a copper funnel passing through the cover:

5 gals. of No. III Oil. Use the iron stirrer briskly until melted gum and oil are intimately incorporated.

The Oil No. III being exceedingly light in color, it will not affect the transparency of the extra pale Zanzibar gum.

EIGHTH OPERATION:



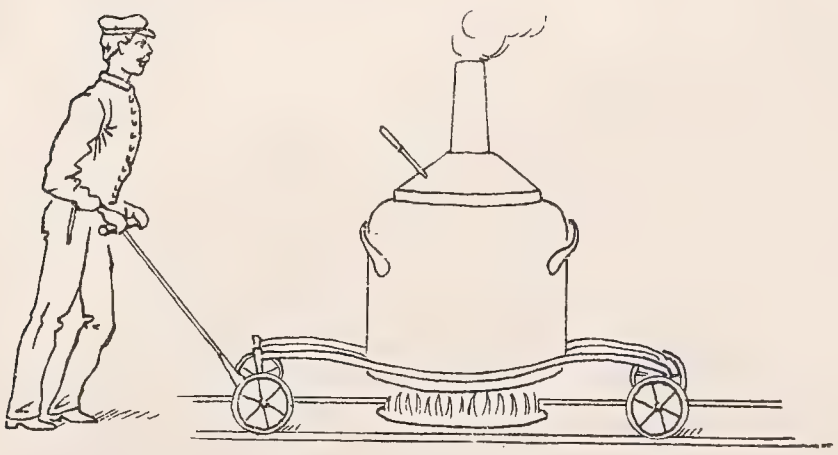
The five gallons of No. III Oil being thoroughly incorporated with the 100 lbs. of Zanzibar Pale, remove kettle about two feet from fire. The rest of the Oil, or 20 gals., must be added while the preparation is standing out of the fireplace. In making Wearing Body Varnish of the highest grade, you must always proceed according to these instructions concerning the addition of th Oil.

NINTH OPERATION:

Take from the iron steam jacketed kettle 5 gals. more of Oil heated at 212 deg. F., and add it through a copper funnel to the preparation, as it has been explained heretofore.

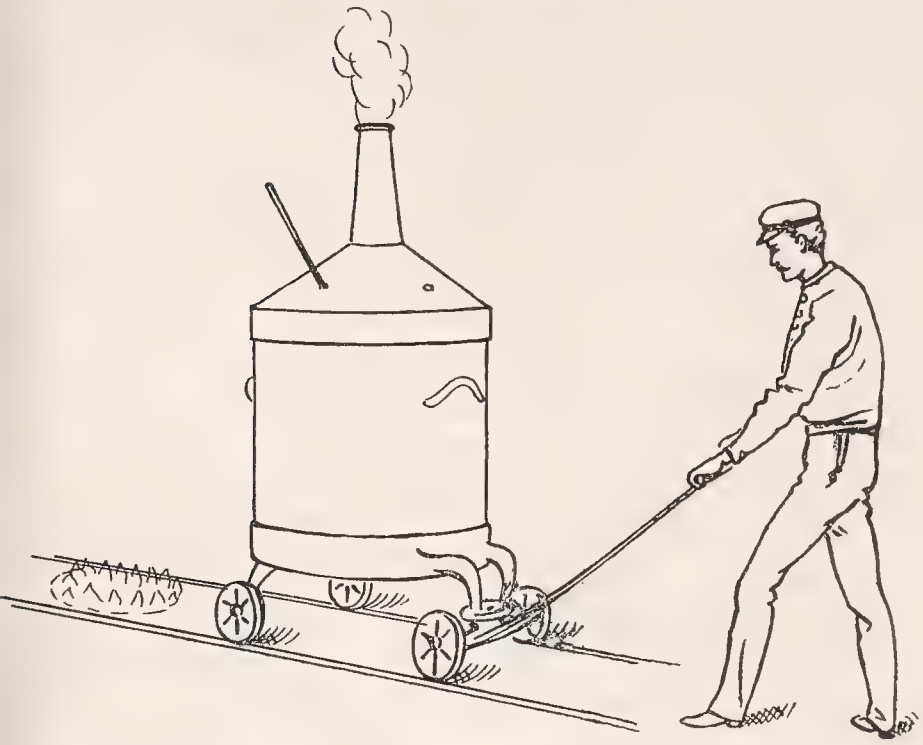
Use the iron stirrer briskly, so,as to perfect the mixture. Keep stirring all the time until oil and gum are intimately mixed.

TENTH OPERATION:



At this stage of the operation, the kettle should be brouhgt over fireplace again and the preparation cooked for about 10 minutes, after which, if the operation has been well conducted, the oil and gum will have produced a perfectly homogeneous mixture.

ELEVENTH OPERATION.



Now, repeat the 8th Operation, remove the kettle from the fire and allow it to stand at from two to three feet from the fire-place.

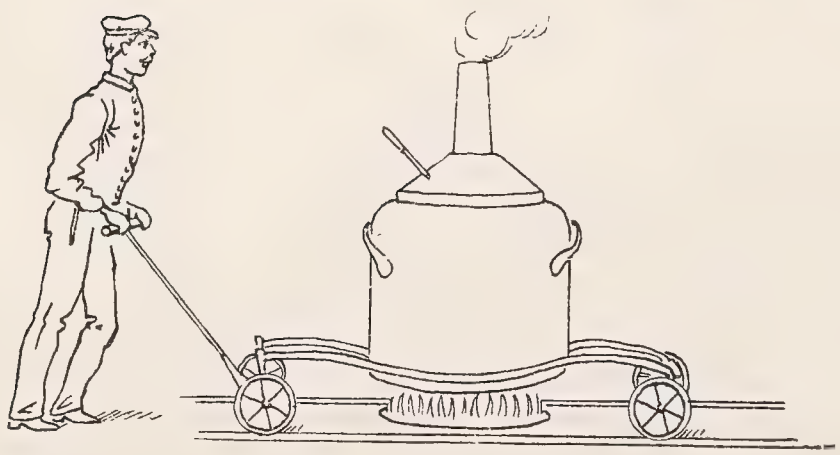
Take from the Steam Jacketed kettle in the oil measure, the last fifteen gallons of Prepared Oil, heated at 312 deg. Fah.

TWELFTH OPERATION.

Add these fifteen gallons in quantities of only five gals. at a time, as per instructions already given.

Use the iron stirrer briskly, so as to perfect the mixture. Keep stirring all the time until Oil and Gum are intimately mixed and incorporated together.

THIRTEENTH OPERATION.



In order to perfect the incorporation of Gum and Oil by the action of heat, bring your kettle over the fire again and cook gently for about ten to fifteen minutes.

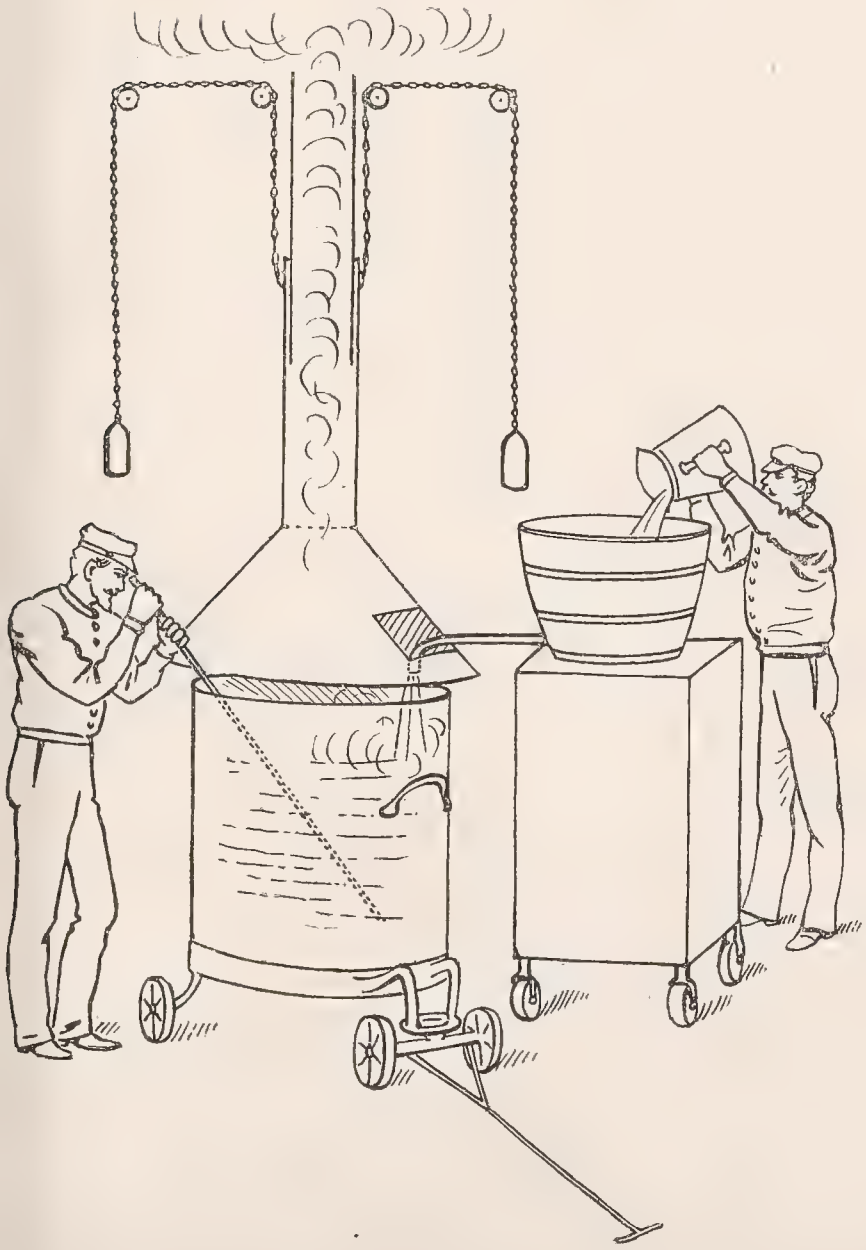
This being done, remove the kettle from the fire.

FOURTEENTH OPERATION:

The preparation is now ready to be diluted.

The kettle should now be removed and carried out of the melting room to the thinning room, where the last operation is going to be performed.

FIFTEENTH OPERATION:



According to the degree of fluidity or the consistency to be given to the finished product, the proportion of diluent or turpentine varies from 20 to 25 gals.

The proportion of 20 gals. of turpentine only, instead of 25, will give a better wearing and higher body Varnish.

#220.

IMPORTANT REMARKS ABOUT THE MANUFACTURE OF WEARING BODY ZANZIBAR.

Manufacturers not having the proper facilities for the preparation of No. III Oil, could use the Borate of Manganese Oil No. II.

Some manufacturers are using for making a "BATCH" of Wearing Body Varnish, the following ingredients: Zanzibar Pale, 100 lbs.; Borate Oil No. II, 18 gals.; and thinned down with 20 gals. of Turpentine.

Others increse the amount of Oil to 32 gals. which certainly gives a greater wearing, but to the detriment of the gloss.

Regarding the thinning down, one of the finest wearing Body Varnishes made in the United States, contains a slight proportion of Camphorated Naphtha.

Wearing Body Varnishes of a high grade are not only made from Zanzibar. Some manufacturers use different gums, such as Benguela, Sierra Leone, or Kauri. We give hereafter these formulae separately.

#230.

W E A R I N G B O D Y B E N G U E L A .

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The following formula gives as a result a Wearing Body Varnish presenting admirable working properties.

Benguela Gum, and especially the grade known as "Yellow Benguela", gives a Varnish possessing to the highest degree that peculiar feature which is designated under the name of "Toughness".

FORMULA: Yield in Gallons.

6	100 lbs.	Yellow Benguela.
18	18 gals.	No. II Borate Oil.
20	20 "	Turpentine.
44 Gals.		

INSTRUCTIONS:

The proportions above specified are modified according to the requirements of the trade. Some manufacturers are using the above formula, while others use 27 gals. of oil thinned down with 28 gals. of Turpentine.

W E A R I N G B O D Y
K A U R I .

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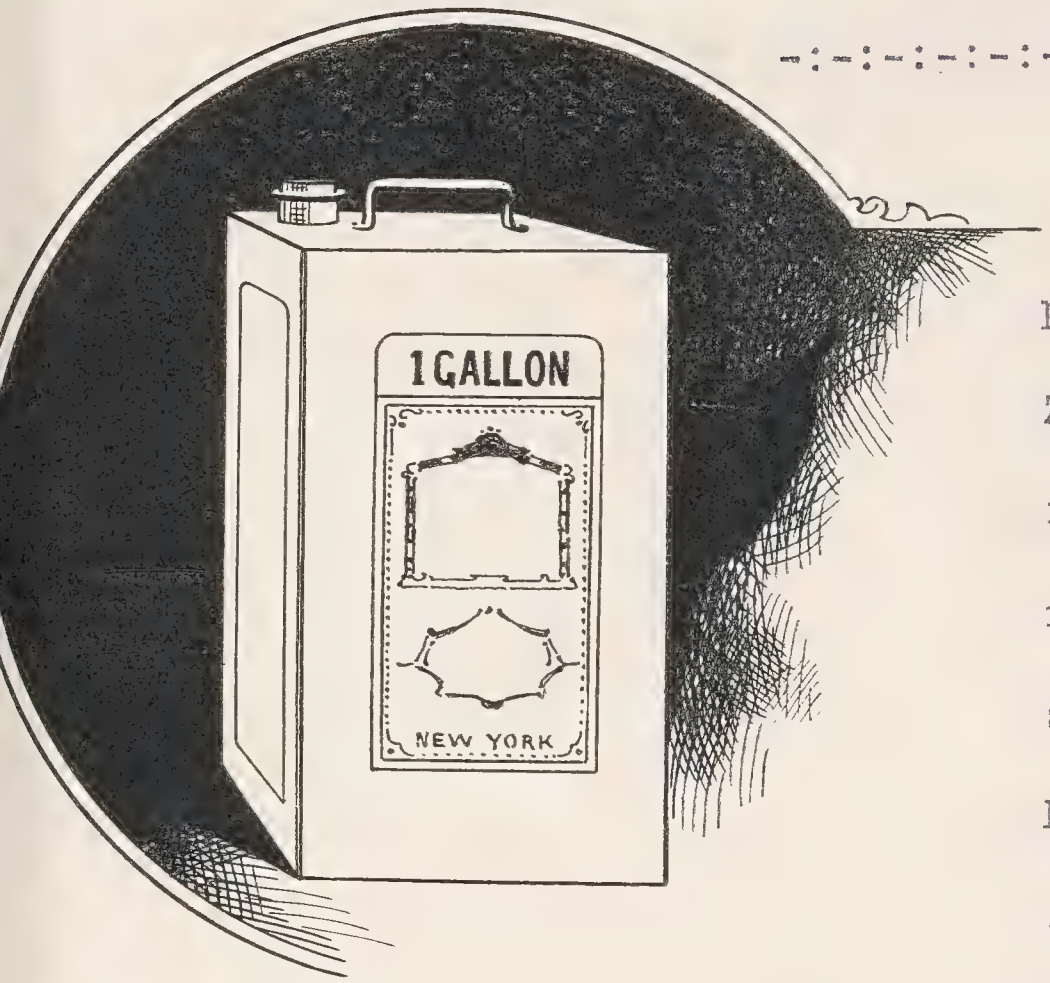

Althoug Kauri Gum does not present any of the features of Zanzibar and Benguela; although it has not the hardness of the first nor the "TOUGHNESS" of the second; the highest grade of KAURI, commercially named "XXX", is extensively used in place of Zanzibar and Benguela.

FORMULA:

Yield in Gallons.

6	100 lbs.	Kauri, XXX.
18	18 gals.	No. II Borate Oil
20	20 gals.	Turpentine.
44 gallons.		

INSTRUCTIONS:

The proportions above specified can be modified, as has been explained in the Formula for making Wearing Body Benguela. Some manufacturers are making what they call "FINE WEARING BODY" by using 27 gals. of Oil and 30 gals. of Turpentine, the amount of Kauri Gum remaining the same.

Part No.

(See Index on the next page.)

Subject Treated.

COMPLETE FORMULARY AND INSTRUCTIONS FOR MANUFACTURING

ALL SORTS OF

H A R D D R Y I N G B O D Y V A R N I S H E S

AND FLOWING VARNISHES.

Part No. III.

COMPLETE FORMULARY AND INSTRUCTIONS FOR MANUFACTURING ALL SORTS OF HARD DRYING BODY VARNISHES. AND FLOWING VARNISHES.

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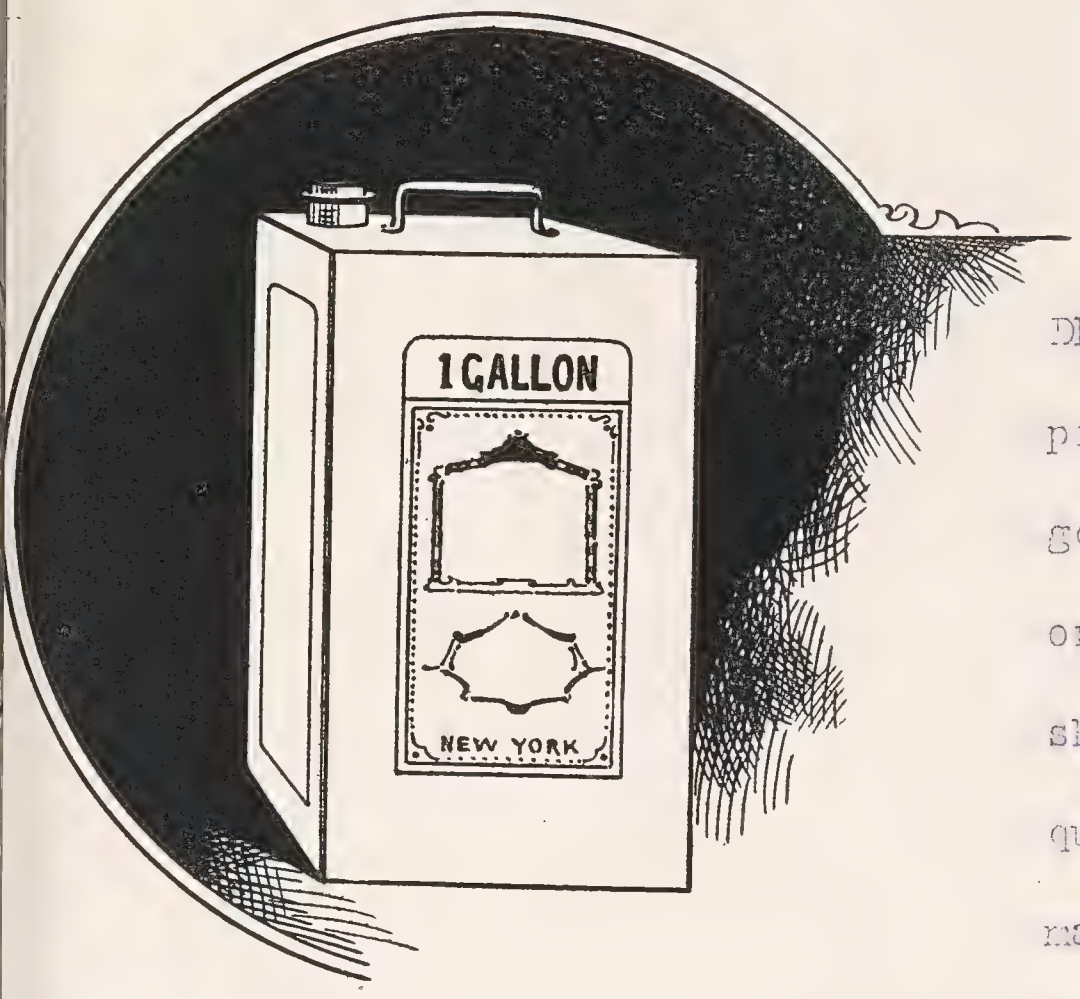
#300.

HARD DRYING BODY VARNISHES.



Under the name of "HARD DRYING BODY VARNISHES" are comprised a variety of high grade goods intended for undercoats on superior work. This Varnish should dry very hard, not too quickly. The finest English make can be rubbed in about 4 or 5 days without sweating.

Like Wearing Body Varnishes, a HARD DRYING BODY VARNISH is made either from Zanzibar, from Benguela or from Kauri. Some Varnish makers use North Coast.

We give hereafter some of the best formulae known.

FORMULA:

Yield in gallons:

6	100 lbs.	Extra fine Benguela.
12	12 gals.	Light Borate Oil No. II
22	22 "	Turpentine.
40 gals.		

For other formulae, see next page.

310.

H A R D D R Y I N G B O D Y V A R N I S H E S .

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OTHER FORMULAE:

Yield in gallons:

6	100 lbs.	Zanzibar Pale A.
10	10 gals.	Manganese Oleate Oil NO.V
22	22 "	Turpentine.
2	2 "	Camphorated Naphtha.
40 Gals.		

6	100 lbs.	North Coast.
12	12 gals	No. III French Oil.
22	22 "	Turpentine.
40 gals.		

6	100 lbs.	Kauri X X X .
12	12 gals.	No. II OIL.
20	20 "	Turpentine.
38 gals.		

No.9.

F L O W I N G V A R N I S H E S.

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After many years of experiment, I have been able to trace the causes of a SUPERIOR FLOWING in certain Varnishes which have acquired a world-wide reputation.

In the formula herebelow, I give the secret of producing VARNISHES OF ALL GRADES which will "FLOW" so easily under the brush that a child could apply them evenly on any verticle or horisontal surface.

All the causes which may contribute directly or indirectly to impart a "SUPERIOR FLOWING" to a "RIPE" varnish, or an artificial flowing to a Varnish freshly made, have been described at length in the SCIENCE OF VARNISH MAKING, Part XVII.

Instead of "COOKING" the entire amount of Oil with the gum in the Varnish kettle, some of the oil should always be kept for mixing cold. In other words, a FLOWING VARNISH is to be prepared in two distinct operations:

1st. - - - The treatment on fire.

2nd. - - - The treatment when cold,

as per instructions hereafter given.

S U P E R I O R F L O W I N G.

Yield In Gallons:

6 - - - - - - 100 lbs. - - - - - - North Coast.

6 - - - - - - 8 gals. - - - - - - Hard Umber Oil No. XI.

16 - - - - - - 16 " - - - - - - Turpentine.

30 gals.

Make this Varnish as per instructions given in WEARING BODY. Bond to the tank and allow to cool and clarify. If you have a filter press, the entire operation can be performed as soon as the Varnish made as per formula above will have been filtered and clarified through paper.

TREATMENT WHEN COLD:

FLOWING is then imparted mechanically by the addition of a HEAVY BOIL PREPARED OIL in the proportion of 25 gals. per every 100 gals. of Varnish made as per formula above.

HEAVY BOIL PREPARED OIL can be had ready for use directly from the market. If the Varnish maker desires to make it, he will find all the instructions necessary in the SCIENCE OF VARNISH MAKING, Part XIII. (See process for oxidizing and bodying or thickening linseed Oil by the direct action of a continuous current of air.)

On account of its high degree of "TOUGHNESS", this oil would curdle if it were mixed with a molted gum in the kettle.

#350.

F L O W I N G E X T R A .

Yield in gallons:

6	100 lbs.	Benguela.
2	20 "	French Artificial Kauri.
10	10 gals.	Hard Umber Oil No. XI/
12	12 "	Turpentine.
3	2 "	Camphorated Naphtha.

When cold and clarified, add to it under constant stirring and until perfectly incorporated, 10 gals. of HEAVY BODY OIL.

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F L O W I N G N O . I .

6	100 lbs.	Kauri X.
5	50 "	French Artificial Kauri W.W.
10	10 gals.	Hard Umber Oil No. XI.
10	10 "	Turpentine.
5	5 "	Benzine.
2	2 "	Camphorated Naphtha.
38 gals.		

When cold and clarified, add to it until constant stirring and until perfectly incorporated 14 gals. of Heavy Body OIL.

PART No. IV.

(See Index on the next page.)

SUBJECT TREATED.

COMPLETE FORMULARY AND INSTRUCTIONS FOR MANUFACTURING

ALL SORTS OF

RUBBING AND POLISHING VARNISHES.

Part No. IV.

COMPLETE FORMULARY AND INSTRUCTIONS FOR MANUFACTURING

ALL SORTS OF

R U B B I N G A N D P O L I S H I N G V A R N I S H E S.

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"400.

R U B B I N G A N D P O L I S H I N G V A R N I S H E S

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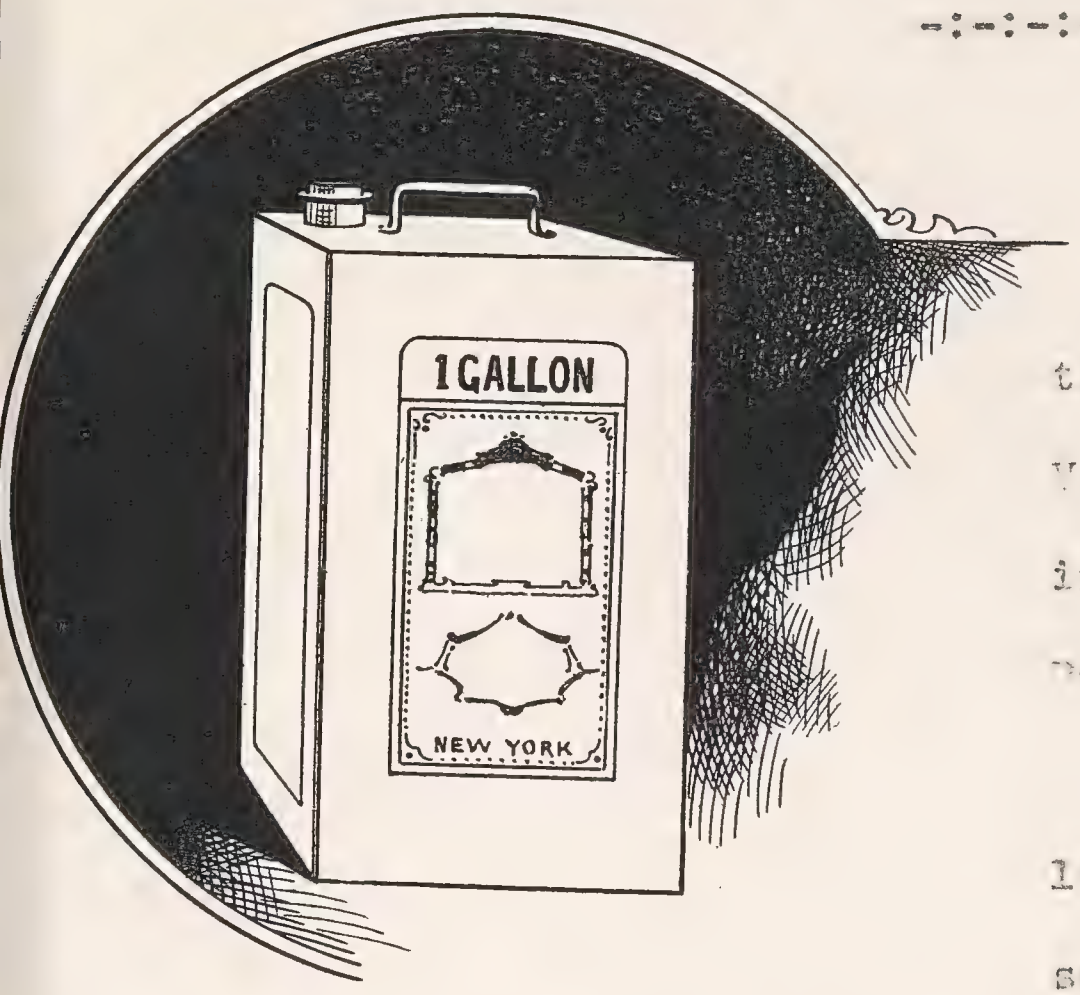

Under the above denomination are comprised a variety of Varnishes: the RUBBING generally intended for undercoats and the POLISHING for finishing coat.

According to the time allowed for a certain Varnish to set hard, a different name is given: and consequently, there are various parts of RUBBING VARNISHES. The commercial names generally given are:

QUICK RUBBING, QUICK RUBBING EXTRA PALE, QUICK RUBBING No. I, CHEAP RUBBING and BLACK RUBBING. There is also another grade drying not so quick, and known as "MEDIUM RUBBING".

FORMULA: PALE RUBBING.

Yield in gallons:

6 - - - - - 100 lbs. - - - - - North Coast A.

6 - - - - - 6 gals. - - - - - No. V. OIL.

or - - - - - 8 " - - - - - No. II OIL.

25 - - - - - 25 " - - - - - Turpentine.

39 gals.

R U B B I N G A N D P O L I S H I N G V A R N I S H E S.

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MEDIUM RUBBING.

FORMULA:

Yield in gallons:

6 - - - - - 100 lbs. - - - - - N. North Coast.

8 - - - - - 8 gals. - - - - - Prepared Oil No. II.

20 - - - - - 20 " - - - - - Turpentine.

34 gals.

QUICK RUBBING.

6 - - - - - 100 lbs. - - - - - Kauri N.

6 - - - - - 6 6 gals. - - - - - Oil No. II.

22 - - - - - 22 " - - - - - Turpentine.

34 gals.

CHEAP RUBBING.

10 - - - - - 100 lbs. - - - - - French Artificial Kauri.

6 - - - - - 100 " - - - - - Kauri No. III.

12 - - - - - 12 gals. - - - - - Oil No. II

15 - - - - - 15 " - - - - - Turpentine.

2 - - - - - 2 " - - - - - Camphorated ophthe.

35 - - - - - 35 " - - - - - Benzine.

68 gals.

R U B B I N G A N D P O L I S H I N G V A R N I S H E S.

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POLISHING ZANZIBAR.

Yield in gallons.

12	300 lbs.	Zanzibar Pale.
15	15 gals.	No. II Oil.
30	30 "	Turpentine.
20	20 "	Benzine.
3	3 "	Carbonated Naphtha.
80 gals.		

The above formula is used for making the finest grades of Varnishes sold under the name of FINE PIANO POLISHING. A similar Varnish very much used for that purpose is also the result of the following formula, in which, Benguela is used instead of, Zanzibar.

POLISHING BENGUELA.

12	300 lbs.	Yellow Benguela.
10	10 gals.	Prepared Oil No. II
30	30 "	Turpentine.
20	20 "	Benzine.
3	3 "	Carbonated Naphtha.
75 gals.		

This Varnish ranks amongst the very highest grades.

#460.

CHEAP RUNNING POLISHING VARNISH.

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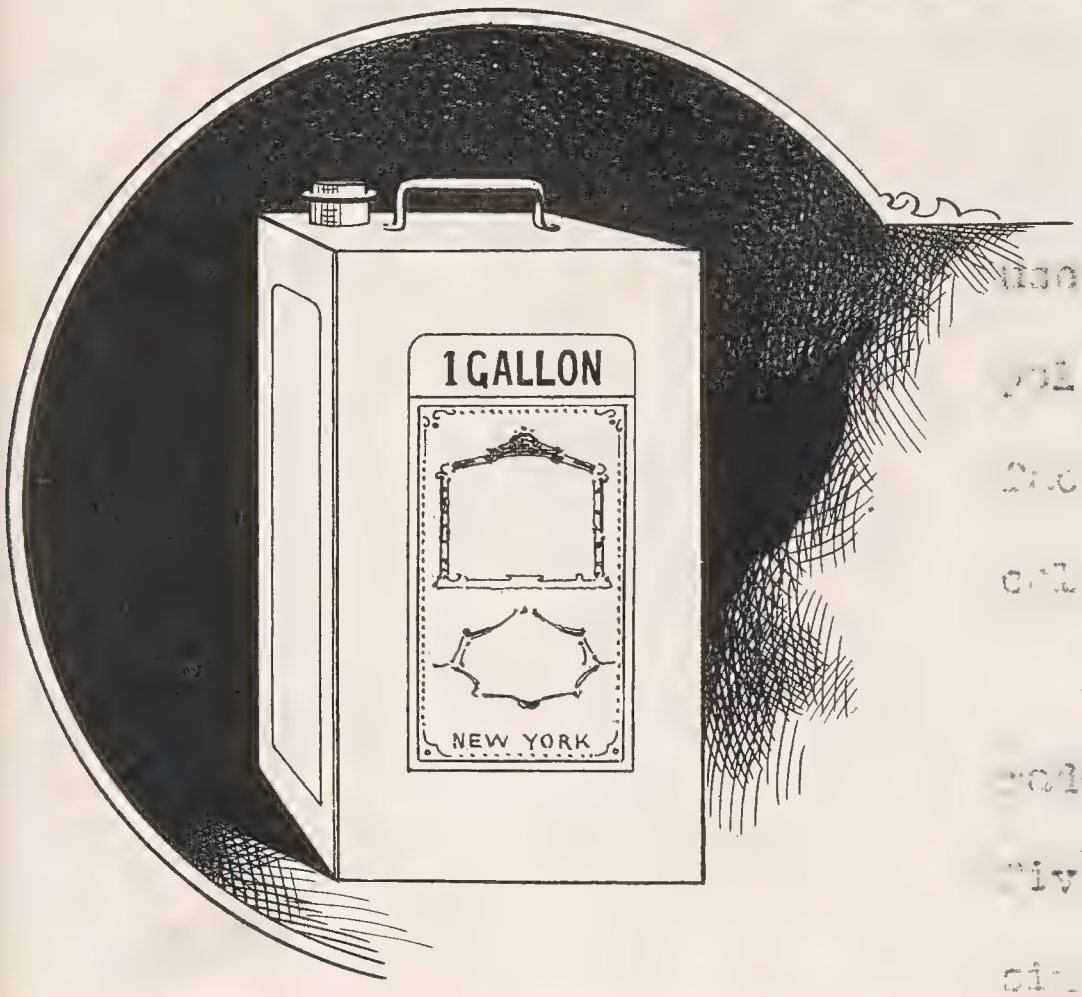
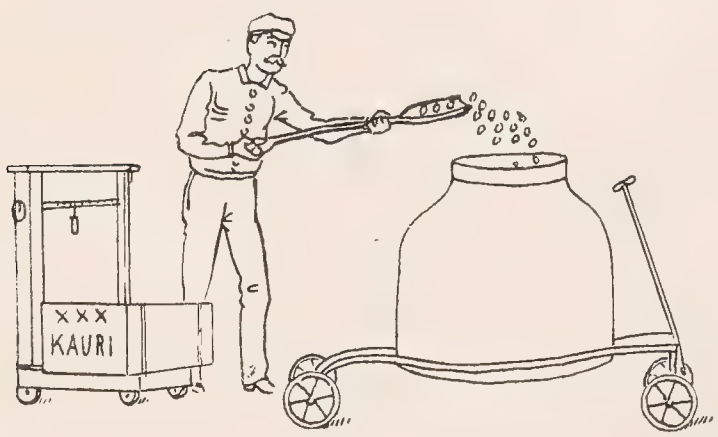


There is considerable use for a cheap running polishing varnish, than not manufacturers of furniture and agricultural implements.

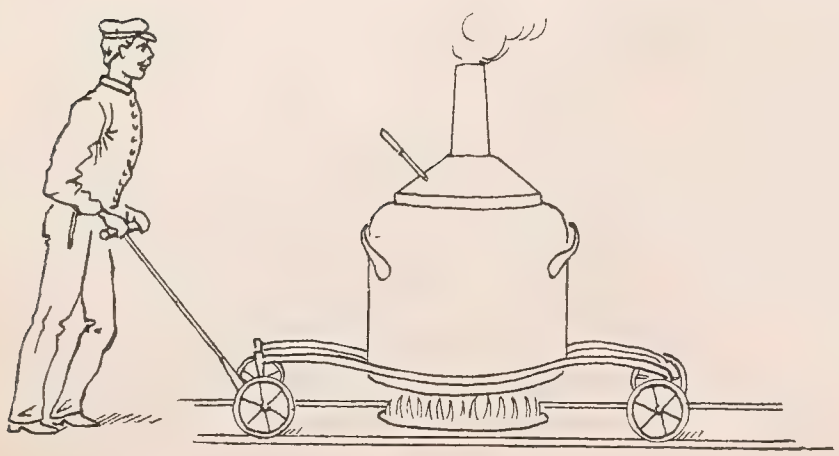
This varnish is very easily made; one operator can produce five gallons in one day a single kettle.

FIRST OPERATION:



Take accurately, 140 lbs. of Kauri No. II. and 100 lbs., of French Turpentine (Kauri or Dura Hard Resin, made as per instructions already given in the SCIENCE OF VARNISH, Chapter 5.

SECOND OPERATION:



Then pour kettle over the fire made of coke, well kindled and free from flames. Leave the cover on the kettle and proceed rapidly, as per instructions hereafter.

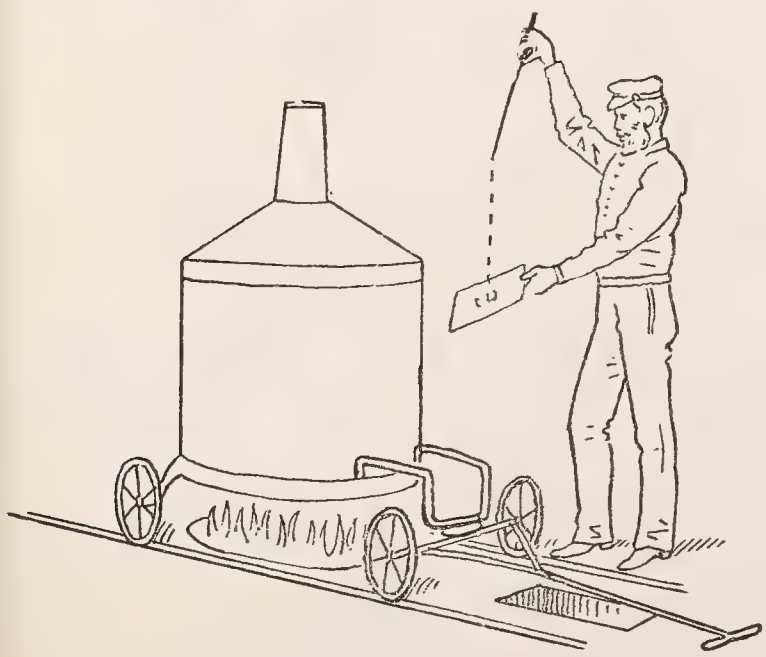
THIRD OPERATION:

Melt rapidly the Kauri, by using the iron stirrer briskly; be careful not to overheat, on account of the Low Flashing Point of Resin, which is the cause of the French Artificial Kauri. Stir constantly until no lumps of gum will adhere to the bottom of the kettle.

FOURTH OPERATION:

Leave the preparation on fire until all the moisture matters from the Kauri and the dampness of that gum will be volatilized by heat and no fumes will appear at the top of the head fitted on the cover.

FIFTH OPERATION:



As soon as the dense fumes resulting from the melting of the Kauri will no longer appear, test the mixture and well to glue so as to ascertain their fluidity; and if it runs from the spatter in a perfectly liquid state, no more heating is needed as far as the melting operation is concerned.

SIXTH OPERATION:

The oil which is to be added to the melted mixture of resin gums in the varnish kettle should be heated at a temperature of only 150 deg. F. Place in the steam jacketed kettle, 15 gals. of the refined oil, also called "Hard Amber Oil". (See formula and process)

This oil should be heat to 150 deg. F., it is then removed from the steam jacketed kettle in an oil measure.

SEVENTH OPERATION:

The oil is then added to the preparation of melted gums through a funnel placed on the cover; and as soon as oil and gums are intimately incorporated by the action of fire, which requires only five or six minutes remove the kettle from the furnace quickly.

The operation should be very rapidly conducted to avoid livering up or curdling of the whole mass.

EIGHTH OPERATION:

Remove immediately the kettle from the fire, as it has been already said.

The mixture of melted Kauri and hard prepared Rosin, although it is not liable to liver up suddenly on fire as melted Kauri alone when this comes in contact with the quick Drying Oil, it is advisable to remove the kettle from the fire place immediately after the prepared oil and the mixture of rosin gum have been intimately incorporated together.

NINTH OPERATION:

The thinning down of cheap Dublin Polishing Varnish should be done with 6 gals. of turpentine and 16 gals. of Naphtha per every 100 lbs. of gum used.

Consequently, for the proportions used in this formula, the quantity of thinners should be 40 gals. in all.

I am of the opinion that the best way of thinning down this preparation, consists in 16 gals. of Turpentine, 20 gals. of Benzine and 10 gals. of Naphtha.

#470.

FORMULA AND INSTRUCTIONS FOR MAKING

AN ECONOMICAL RUBBING VARNISH SUBSTITUTE FOR SURFACING.

-:-:-:-:-:-:-

The following preparation is very easy to make, requires no special knowledge in chemistry or Varnish making, and gives as a result a Varnish-like compound, drying rapidly very hard, filling the pores of the wood as well as the best filler known, and RUBBING or SAND PAPERING with great smoothness; in fact, for first coat on new goods especially, it produces at a very low cost a solid foundation for almost any kind of Varnish or HARD OIL FINISH.

FORMULA:

White Dextrine - - - -	5 lbs.
Senegal Gum - - - - - -	1 "
Borax - - - - - - - - - -	1 "
Water at 200 deg. - - -	10 "

INSTRUCTIONS:

Use a petroleum barrel, mounted on a platform, with a pail underneath, as per cut. Fill this barrel two-thirds with clear water, then turn the steam in

and bring it to the boiling point. This being done, shut off the steam and take 10 gals. of this boiling water, using the pail underneath; carry this water into another petroleum barrel where the operation is to be conducted.

Add first the 1 lb. of Borax and dissolve it under constant stirring. When the Borax has been dissolved, the Senegal Gum should be added exactly in the same manner, a small proportion at a time and under constant stirring. The Senegal Gum should be thoroughly dissolved in the Borax solution before anything else is added.

At this stage of the operation, the preparation has already produced a thin size. Proceed rapidly in dissolving the ingredients above named, so as to have a temperature of about 200 deg. F. at this moment.

Now take your 5 lbs. of WHITE DEXTRINE and add it to the preparation through a metallic sieve about 40 mesh; sprinkle the Dextrine over the surface of the water so as to avoid the production of lumps which will not be taken up by the water. Stir constantly so as to help the solution. A little practice will enable the operator to make a "BATCH" in a very short time. Allow to cool and the propaaration is ready for the market.

#400.

FORMULARY AND INSTRUCTIONS FOR MAKING

B L A C K R U B B I N G V A R N I S H.

-:-:-:-:-:-:-:-

The best process for manufacturing what is called "BLACK RUBBING, consists in grinding finely Hydro Carbon Black or Lamp Black in QUICK DRYING JAPAN to the consistency of a stiff paste. A slight proportion of Prussian Blue (about 1/10th in weight of the Lamp Black Dry) should be added to the black and grind ground with it, so as to neutralize the yellowish tinge and thus produce a deep shade of VELVET BLUE BLACK.

The paste thus obtained should be sent to the mill and ground a second time. The finer the grinding, the less will be the tendency of the material to settle.

After the paste has been finely ground in Quick Drying Japan, it should be thinned down with twice its volume of a Quick Rubbing Varnish in which a small proportion of Oil Black has been added, and thoroughly dissolved at a temperature of 250 deg. F.

The Soluble Oil Black is intended to impart to the ordinary Rubbing Varnish (the color of which is yellow) the tint of a Black Ink. See in the Repertory of Addresses, under the heading of "Colors Soluble In Linseed Oil", the address where this product can be had. After having thinned down the Black Japan Paste with the Black Stained Rubbing Varnish, under constant stirring, the product is ready to be put up in cans.

PART No.

(See Index on the next page.)

SUBJECT TREATED.

COMPLETE FORMULAE AND INSTRUCTIONS FOR MANUFACTURING

OF SHEETS OF

ELASTIC, TRANSPARENT AND RADIO OPAQUE VARNISHES.

Part No. V.

COMPLETE FORMULAS AND INSTRUCTIONS FOR MANUFACTURING

MY GREAT OF

ELASTIC, TRANSPARENT AND BAKING COPAL VARNISHES.

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ELASTIC, TRANSPARENT AND BAKING COPAL VARNISHES.

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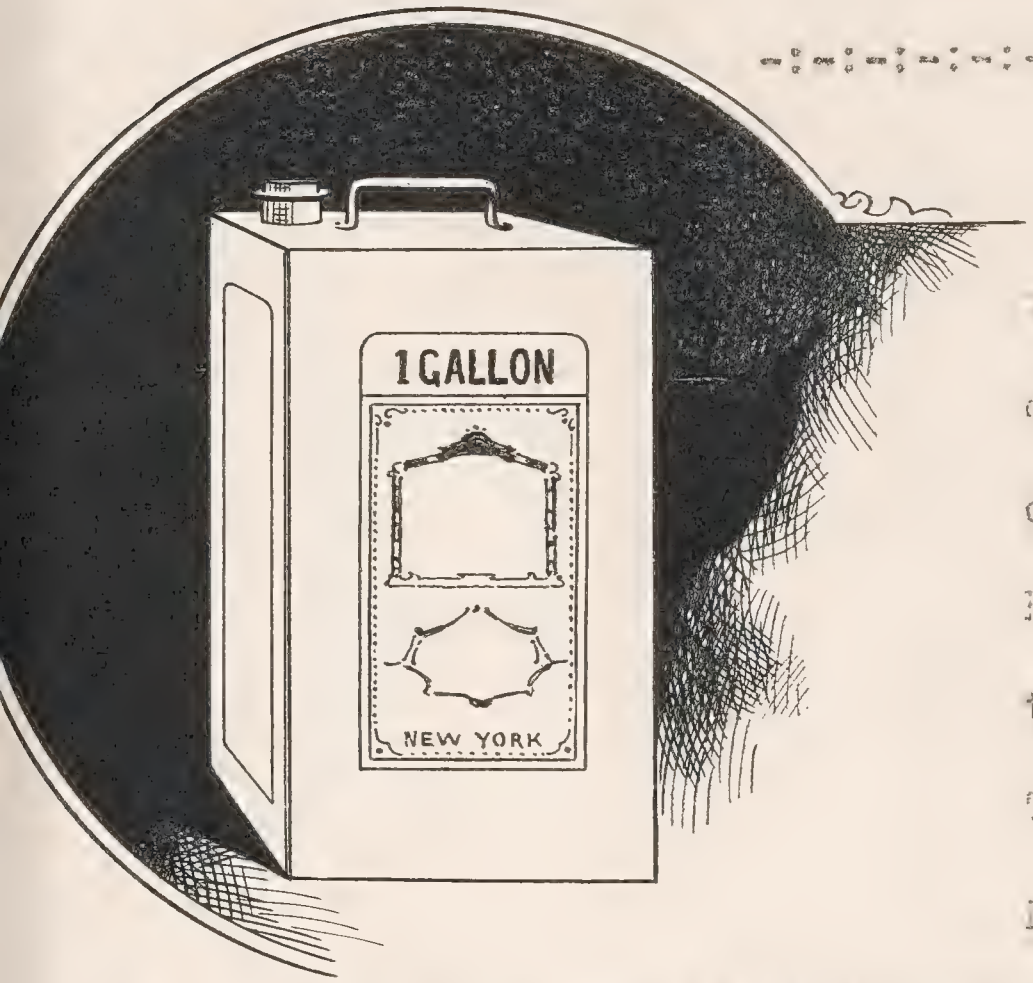

Under the name of COPAL VARNISH are comprised a series of KAURIoor MANILA preparations compounded with or without HARD ROSIN and a quick DRYING OIL, thinned down with Naphtha or Turpentine in more or less proportions.

510. No. 1, BAKING COPAL VARNISH.

Yield in Gallons:

12	300 lbs	XX Kauri.
8	8 gals	No. 1, Borate Oil
30	30 gals.	Turpentine.
10	10 gals.	Camphorated Naphtha.
60 gals.		

520. No. 2, BAKING COPAL VARNISH.

6	100 lbs	X Kauri.
10	100 lbs.	French Artificial Kauri
8	8 gals.	No. 1, Borate Oil.
30	30 gals.	Turpentine.
20	20 gals	Camphorated Naphtha.
64 gals.		

#540.

NO. III PALE ICE COPAL VARNISH.

Yield in gallons:

6 - - - - - 100 lbs. - - - - - - No. III Kauri.

10 - - - - - 100 lbs. - - - - - - French Artificial Kauri.

6 - - - - - - 6 gals. - - - - - No. I Borated Oil.

10 - - - - - 10 " - - - - - - Turpentine.

10 - - - - - 10 " - - - - - - Benzine.

0 - - - - - 30 " - - - - - - Camphorated Naphtha.
64 gals.

#540. ELASTIC, UNBREAKABLE BRIGHT COPAL.

6 - - - - - 100 lbs. - - - - - - K K K Kauri.

17 - - - - - 17 gals. - - - - - - No. V Oil.

20 - - - - - 20 " - - - - - - Turpentine.

2 - - - - - 2 " - - - - - - Camphorated Naphtha.
45 gals.

#560. WINTER FINISHING PALE COPAL.

6 - - - - - 150 lbs. - - - - - - K K Kauri.

5 - - - - - 50 " - - - - - - French Artificial Kauri.

35 - - - - - 35 gals. - - - - - - No. VII Oil.

20 - - - - - 20 " - - - - - - Turpentine.

2 - - - - - 2 " - - - - - - Naphtha.
67 gals.

These Copal Varnish s find many applications, especially in cases where Stoving or Baking is necessary.

PART No. VI.

(See Index on the next page.)

SUBJECT TREATED.

COMPLETE FORMULARY AND INSTRUCTION FOR MANUFACTURING

ALL KINDS OF

F U R N I T U R E A N D C O A C H V A R N I S H E S.

Part No. VI.

COMPLETE FORMULARY AND INSTRUCTIONS FOR MANUFACTURING

ALL SORTS OF

F U R N I T U R E A N D C O A C H V A R N I S H E S.

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FURNITURE AND COACH VARNISHES.

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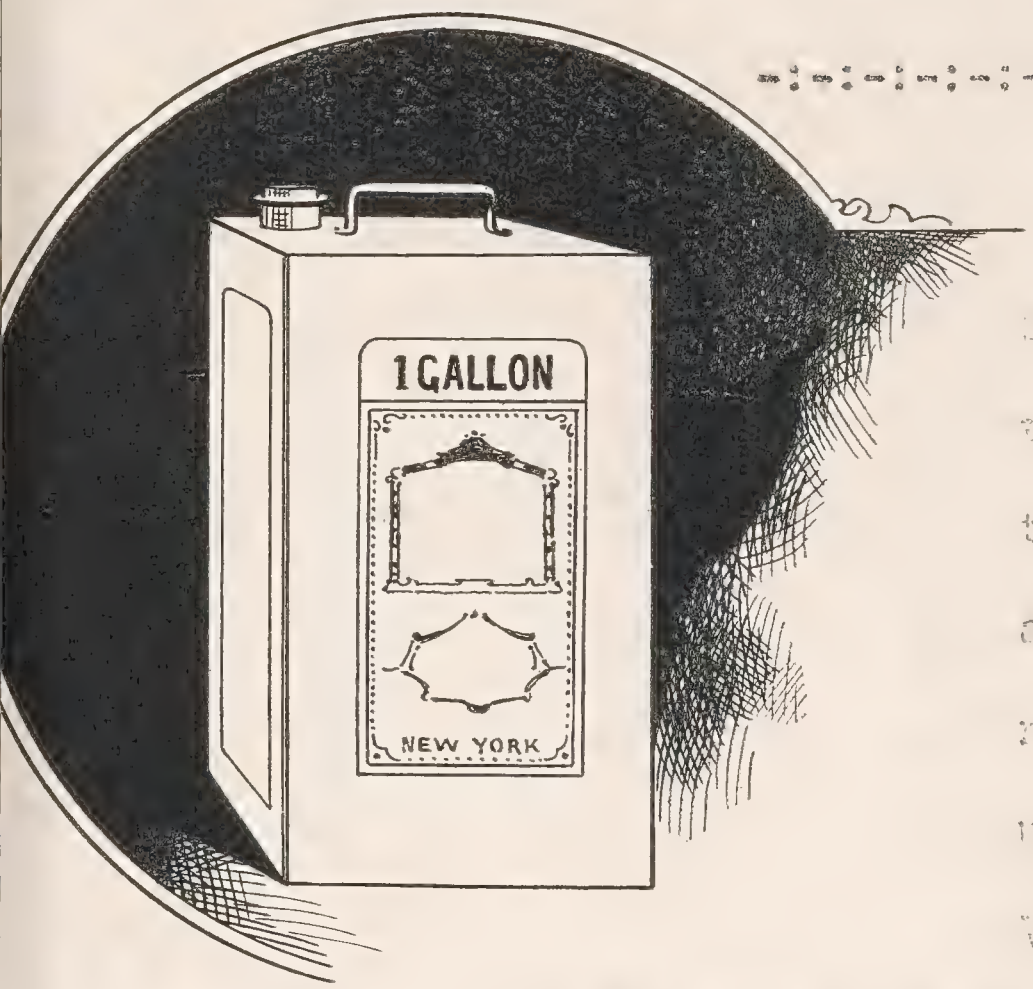

There is not in the United States a more extensive application of the ART OF VARNISH MAKING than in the production of glossy and brilliant coatings, sold, nowadays, at almost any price, under the name of "FURNITURE VARNISHES AND COACH VARNISHES"

For one gallon of WHITE HOUSE, HARD DRYING, FLOWING, RUBBING or FINISHING VARNISHES made from the highest grade of Hard Gums, such as ZANZIBAR, NORTH COAST, BELGUMA, compounds, in which the skill of the operator has to make up for the poor quality and cheapness of the ingredients, are used.

This simply means that Varnish is applied to articles of every description, nowadays, regardless of their inferior value, and in many instances instead of a paint, the price of which would be higher than that of a cheap Varnish. Common Furniture Varnishes are put on the market today at a price as low as 65 cents per gallon.

A Kauri Varnish having an intrinsic value of 65 cents per gallon, or costing 65 cts. per gal. factory price, including labor, is considered as a very fair article. This simply means in plain words that it would be utterly impossible to produce it cheaper without impairing the QUALITY, the WEAR, the GLOSS, the WHITE and the HARDNESS to such an extent that the Varnish would hardly be better than a cheap compound made from common rosin thinned down with naphtha.

There is not another kind of Varnish which finds such a competition as FURNITURE and COACH. The applications are so many and the requirements of the trade so varied, that from the highest to the lowest grade of HAT VARNISHES there is a very large demand for what is called "FURNITURE" and "COACH".

Every Varnish maker has his own formula for making a FURNITURE VARNISH which will best answer the special requirements of his trade; so in giving my own formulae, I do not pretend to cover entirely the field of operations that a Varnish maker must be familiar with in order to compete with his opponents in trade.

Aside from the various formulae hereafter given, a Varnish maker will find in the SCIENCE OF VARNISH MAKING enough suggestions, practical hints and valuable points to become an expert in the production of almost any grade of FURNITURE and COACH VARNISHES, from the highest to the lowest grade.

When it is a question of the highest grades of FURNITURE or COACH VARNISHES, the boundary of WEARING WORK, FLOWING, RUBBING or POLISHING VARNISHES will be found to contain all the indications necessary to get the finest possible results. But here the question of price is the first consideration, the whole problem in Varnish making consists in giving an artificial life, gloss and transparency through the use of oil and gum substitutes, and avoiding in it meanwhile the drawbacks inherent to the use of these inferior materials.

It is hard to be convinced, although still perhaps than it will require a great deal of [illegible] grades. Still, for the sake, must not be forgotten, that before they present that "Varnish" [illegible] it must not chalk off all the so points required from a knowledge of the "Varge" and "Therefore", especially in questions of "Mixing Gums, Melting them together, Cooking and Thinning down to the proper consistency.

In order to simplify the manufacture of all sorts of furniture and Coach Varnishes of medium and low grades, the Varnish maker will find it necessary to have certain Varnish compounds or special preparations ready made either from Fresh or Vanilla and which he will mix in more or less proportion so as to regulate the price, without having to produce right in the Varnish kettle every possible sort of variety of Furniture Varnish.

#620.

T A N I L A S T O C K F O R F U R N I T U R E V A R N I S H

Yield in gallons:

3	100 lbs.	Ch. Palo Manila.
10	100 "	French Artificial Kauri.
12	12 gals.	No. 2 Varnisure Oil.
30	30 "	Turpentine.
10	10 "	Naphtha.
20	20 "	Camphorated Benzine.
85 gals.		

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620. R O S I N S T O C K F O R F U R N I T U R E V A R N I S H.

Yield in gallons:

30	300 lbs.	Rosin K. or W. W.
	6 gals.	Water.
	4 ozs.	Tyro rind.
	6 lbs.	Caustic Soda.
	8 "	Sugar of Lead.
	5 "	Hydro Calcine.
	1 "	Ground Glass.
20	20 gals.	Benzine.
40 gals.		

The Prepared Rosin Stock is nothing but Fr ich Artificial Kauri, or common rosin hardened and thinned down with Naphtha.

#650. E X T R A F U R N I T U R E V A R N I S H.

Yield in gallons:

6	100 lbs.	Kauri X X X
3	50 "	Zanzibar.
3	30 "	French Artificial Kauri.
7	7 gals.	No. X Furniture Oil.
20	20 "	Turpentine.
8	8 "	Naphtha.

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#640. All other grades of furniture varnishes are obtained by simply mixing a certain proportion of the ROSIN STOCK made as per formula already given, with more or less EXTRA FURNITURE VARNISH, according to the price.

The following gives only one way of making a full line of FURNITURE VARNISHES by mixing the above, which is the best, with the PREPARED ROSIN STOCK, which is the cheapest.

NO. I FURNITURE can be obtained by mixing (cold) three parts of EXTRA FURNITURE VARNISH with one part of PREPARED ROSIN STOCK.

NO. II FURNITURE can be obtained by mixing EXTRA FURNITURE VARNISH and PREPARED ROSIN STOCK in the proportion of 50% of each.

NO. III FURNITURE can be obtained by mixing 25% of EXTRA FURNITURE VARNISH with 75% of PREPARED ROSIN STOCK.

F650.

I N F E R I O R G R A D E F U R N I T U R E V A R N I S H E S.

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The commercial names of EXTRA FURNITURE, NO. I, NO. II, NO. III FURNITURE, FURNITURE COACH, etc., are sometimes given to very low grades. The quality of these Varnishes compared with corresponding brands is far from being uniform, as it can be seen by comparing the results obtained from the formulae given in the previous page, and the formulae which we give hereafter under the same commercial names.

EXTRA FURNITURE VARNISH, according to certain Varnish makers, is made by simply mixing 80% of Manila Stock with 20% of PREPARED ROSIN STOCK.

NO. I FURNITURE VARNISH can be obtained by mixing the same ingredients in the proportion of 50% of each.

NO. II FURNITURE VARNISH is made by mixing 25% of Manila Preparation with 75% of Rosin Preparation.

NO. III COMMON FURNITURE VARNISH, of the lowest grade is nothing but the HARD ROSIN PREPARATION properly neutralized and thinned down with Naphtha, with or without a very small percentage of FURNITURE OIL, the proportion of the latter regulating the price.

#660.

D U R A B L E C O A C H E X T R A L I G H T V A R N I S H.

Yield in gallons:

6	100 lbs.	X X X Kauri.
5	50 "	French Artificial Kauri.
5	50 "	Sierra Leone.
20	20 gals.	No. II Prepared Oil.
10	10 "	Camphorated Naphtha.
44 gals.		

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670. C O A C H D O P E E X T R A P A L E V A R N I S H.

Yield in gallons:

6	120 lbs.	Dammar.
5	50 "	French Artificial Kauri.
15	15 gals.	No. II Prepared Oil.
30	30 "	Turpentine.
10	10 "	Camphorated Naphtha.
66 gals.		

The above Varnishes can be rendered more durable by increasing the proportion of oil; but in this case they cannot be expected to dry over night, which seems to be an absolute requirement for the sale of many varnishes used by carriage and wagon manufacturers.

#680.

H A R D D R Y I N G B O D Y C O A C H.

Yield in gallons:

6	100 lbs.	North Coast.
3	50 "	Benguela.
5	50 "	French Artificial Kauri.
15	15 gals.	No. XI Coach Oil.
30	30 "	Turpentine.
10	10 "	Naphtha.
69 gals.		

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#690.

E X T R A C O A C H V A R N I S H (C O M M E R C I A L .)

Yield in gals.

6	100 lbs.	Kauri X.
5	50 "	French Artificial Kauri.
15	50 gals.	No. XI Coach Oil.
30	30 "	Turpentine.
10	10 "	Naphtha.
66 gals.		

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NO. I COACH (commercial) can be obtained by the same formula as above, using 75 lbs. of Kauri X and 75 lbs. of French Artificial Kauri, thinning down with 20 gals. of Turpentine and 20 gals. of Naphtha.

PART No. VII.

(See Index on the next page.)

SUBJECT TREATED.

COMPLETE FORMULARY AND INSTRUCTIONS FOR MANUFACTURING

ALL SORTS OF

AGRICULTURAL IMPLEMENTS VARNISH.

Part No. VII.

COMPLETE FORMULAE AND INSTRUCTIONS FOR MANUFACTURING ALL SORTS OF

A G R I C U L T U R A L I M P L E M E N T V A R N I S H E S.

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700
A G R I C U L T U R A L I M P L E M E N T V A R N I S H E S .

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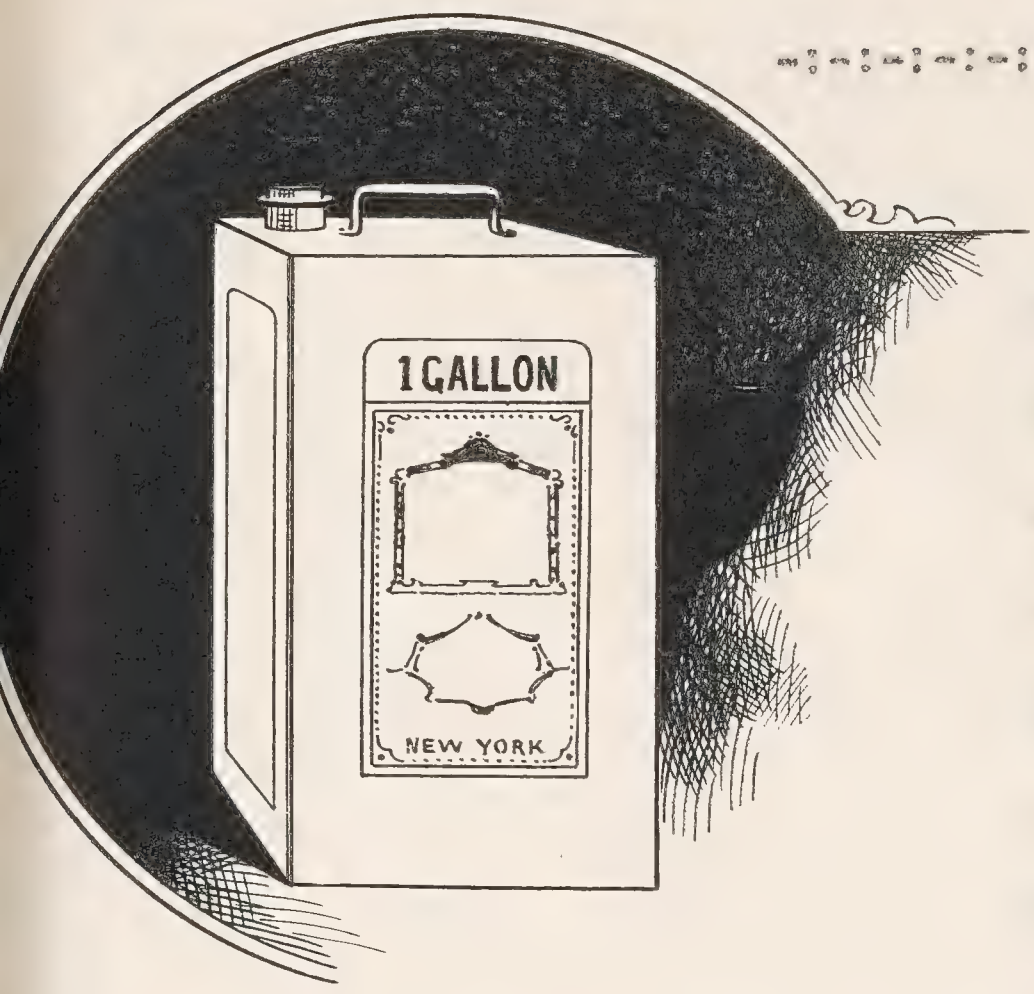

The object of Varnishing over a coat of paint which has been applied to Agricultural implements is not so much to preserve the manufactured article from atmospheric influences as it is to impart a beautiful appearance to the implement when new.

Although it is a fact that agricultural implements remain sometimes six months and even one year in the store before being sold and used in the fields, the question of durability in agricultural implement Varnishes has no great importance; all that is expected by manufacturers using this sort of varnish in large quantities is QUICK DRYING PROPERTY, FINE GLOSS and a VARNISH REASONABLY DURABLE; the question of price being one of the first considerations.

In the 30 Chapters of the SCIENCE OF VARNISH MAKING, the operative Varnish Maker will find all suggestions and practical hints which will enable him to produce Agricultural Implement Varnishes from the highest to the lowest grade, and fulfilling all the

requirements of manufacturers as to CHEAPNESS, GLOSS, QUICK DRYING and RELATIVE DURABILITY.

By a rational application of the peculiar characteristics of French Artificial Kauri combined with Prepared Manila, the Varnish maker does not need to make a special Varnish in the copper kettle for agricultural implements; he can get from his stock of PREPARED ROSIN and PREPARED MANILA the results that he desires.

For Instance:

P720.

NO. I AGRICULTURAL COACH.

75 per cent - - - - - - - Prepared Manila Stock.

25 per cent - - - - - - - Prepared Rosin Stock.

P750.

NO. II AGRICULTURAL VARNISH:

50 per cent - - - - - - - Prepared Manila Stock.

50 per cent - - - - - - - Prepared Rosin Stock.

P750.

NO. III AGRICULTURAL VARNISH:

25 per cent - - - - - - - Prepared Manila Stock.

75 per cent - - - - - - - Prepared Rosin Stock.

By varying the proportions of PREPARED MANILA AND PREPARED ROSIN, the varnish maker increases or reduces the intrinsic value, and regulates his price accordingly. Very satisfactory results are obtained from the formulae above.

PART No. VIII.

(See Index on the next page.)

SUBJECT TREATED.

COMPLETE FORMULARY AND INSTRUCTIONS FOR MANUFACTURING

ALL SORTS OF

OIL SHELLAC, WHITE AND HARD OIL FINISHES.

Part No. VIII.

COMPLETE FORMULARY AND INSTRUCTIONS FOR MANUFACTURING

IN SORTS OF

OIL SHELLAC, WHITE AND HARD OIL FINISHES.

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OIL SHELLAC, WHITE AND HARD OIL FINISHES.

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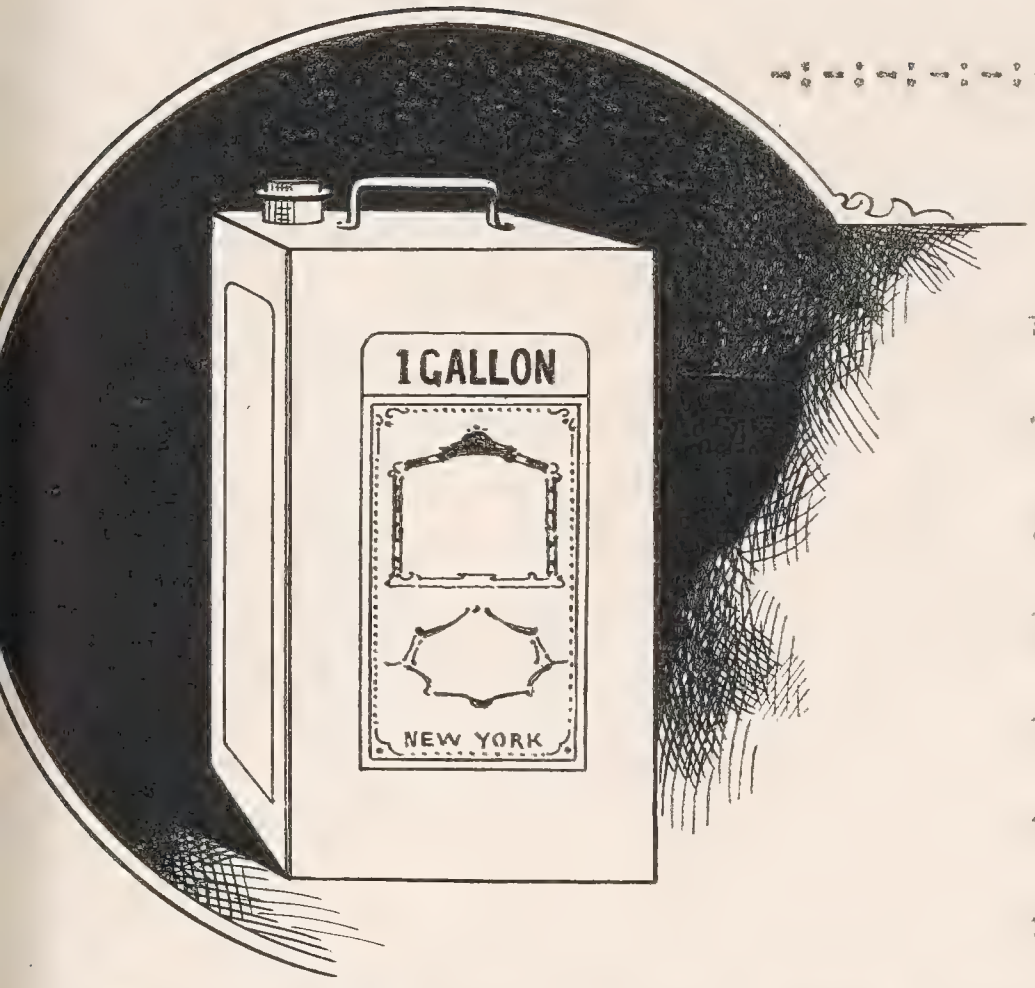

Varnish preparations sold under the above denomination were for years considered as specialities in the Varnish line but owing to the importance and the considerable applications of these goods to the Varnisher and the Cabinet Maker, every manufacturer of today makes a full line of oil Finishes, and sells them under the name of HARD OIL FINISH, WALNUT, LIGHT AND WHITE. I give hereafter, some of the best formulas in existence:

" 810. H A R D O I L W H I T E .

Yield in Gallons:

6	100 lbs	Ext. Pale Zanzibar.
1	10 lbs.....	French Artificial Kauri
7.....	7 gals.	Finishing Oil, No. XIL
20	20 gals.	Turpentine.
5	5 gals.	Naphtha.
39 gals.		

"C99.

P A L E O I L F I N I S H.

Mixed in proportion:

1	100 lbs.	Pale Manila.
1	50 "	French Artificial Copal.
2	2 gals.	No. 4 Furniture Oil.
50	50 "	Turpentine.
10	10 "	Naphtha.
63 gals.		

"C98.

W H I T E O I L F I N I S H.

6	100 lbs.	N X Kauri.
10	100 lbs.	French Artificial Kauri.
10	10 gals.	Hard Umber Oil No. XI.
30	30 "	Turpentine.
20	20 "	Naphtha.
76 gals.		

"D47.

6	100 lbs.	Dongola.
10	100 "	French Artificial Kauri.
10	10 gals.	Hard Umber Oil No. XI.
40	40 "	Turpentine.
10	10 "	Naphtha.
76 gals.		

PART No. II.

(See Index on the next page.)

SUBJECT TREATED.

Part No. IX.

COMPLETE FORMULARY AND INSTRUCTIONS FOR MANUFACTURING ALL SORTS OF D A M A R V A R N I S H E S .

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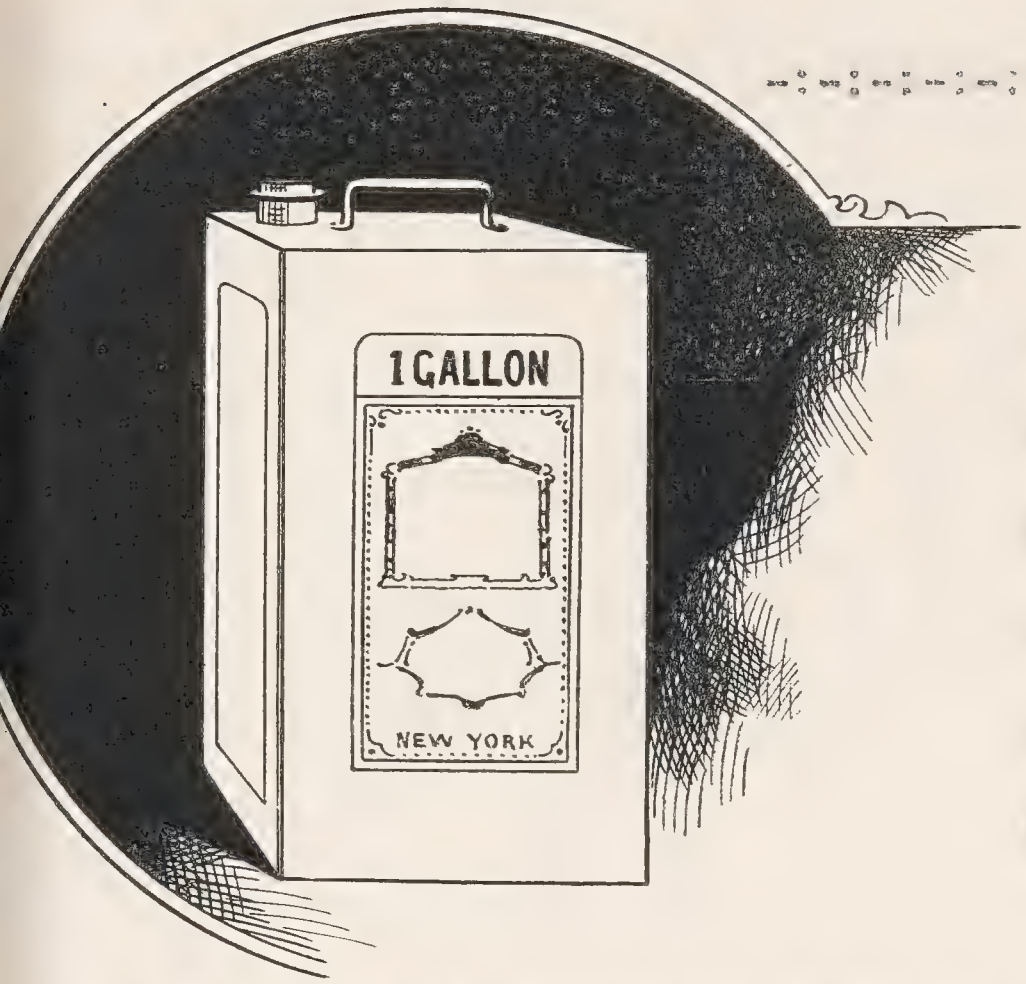

[illegible] of [illegible] Varnish [illegible] [illegible] to be [illegible] by heat, [illegible] [illegible] has been [illegible] by [illegible] [illegible] [illegible], was the first [illegible].

In making Damar Varnishes, if the finished product, [illegible] [illegible], [illegible], [illegible], [illegible] tacky, it is [illegible] [illegible] [illegible]. How to increase thehardness of Damar Varnish is therefore, a question of no small importance, and it has been solved to a certain extent by the same treatment which has been employed and already indicated for hardening and polymerizing oils.

Commercially there are three sorts of Damar, varying in price from $1.00 to $1.[illegible] per gallon, according to quality.

In the manufacture of these Varnishes, the manufacturer regulates the quality and the price by adding together a solution of pure Damar and turpentine with that which is called "SPECIAL DAMAR".

#910.

P R O C E S S F O R H A R D E N I N G G U M D A M A R .

Gum Damar can be treated exactly in the same manner as common rosin, as per process, method and formula described in chapter II of the SCIENCE OF VARNISH MAKING. (See the preparation of FRENCH ARTIFICIAL MAUL). The instructions have to be followed punctually as they are given, from the beginning to the end of the operation, with the only exception that Gum Damar is substituted in the formula for common rosin.

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#920.

E S S E N C E F O R D A M A R .

This is merely a factory name given by the operative Varnish maker to a rosin or fraction which has been neutralized and hardened as per method and process for making French Artificial Maul. But has Gum Damar is perfectly white and almost colorless it is necessary to use in the preparation of Essence of Damar, a colorless rosin, which is commercially named W. W., or Water White Rosin.

The Essence for Damar is made according to the method, formula and process described under the heading of Prepared Rosin Stock in chapter VI of the SCIENCE OF VARNISH MAKING. Instead of using Rosin A, the formula calls for Rosin W. W.

940.

E X T R A S U P E R I O R D A M A R V A R N I S H.

100 lbs. - - - - - - - - - - Hardened Batavia Damar.

5 " - - - - - - - - - - - Sugar of Lead.

20 gals. - - - - - - - - Turpentine.

DAMAR VARNISH NO I.

Is obtained by simply mixing 75% of Extra Superior Damar Varnish, made as per formula above, with 25% of Essence for Damar, taken from the stock in tank.

940.

D A M A R V A R N I S H N O. I I.

Is obtained like No. I, using 50% or equal parts of the two components above named.

950.

D A M A R V A R N I S H N O. II.

Is the resul t of mixing 75% or three parts in volume, of Essence for Damar, with 25% or one part in volume, of Extra Superior Damar Varnish.

When Damar Varnish is made from ingredients properly treated, it has not a tendency to soften at 100 deg. F.

PART No.

(See Index on the next page.)

SUBJECT TREATED.

Part No. X.

COMPLETE FORMULARY AND INSTRUCTIONS FOR MANUFACTURING ALL SORTS OF BROWN, GOLD SIZE AND GRINDING JAPANS.

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MANUFACTURING BROWN AND GOLD SIZE JAPAN.

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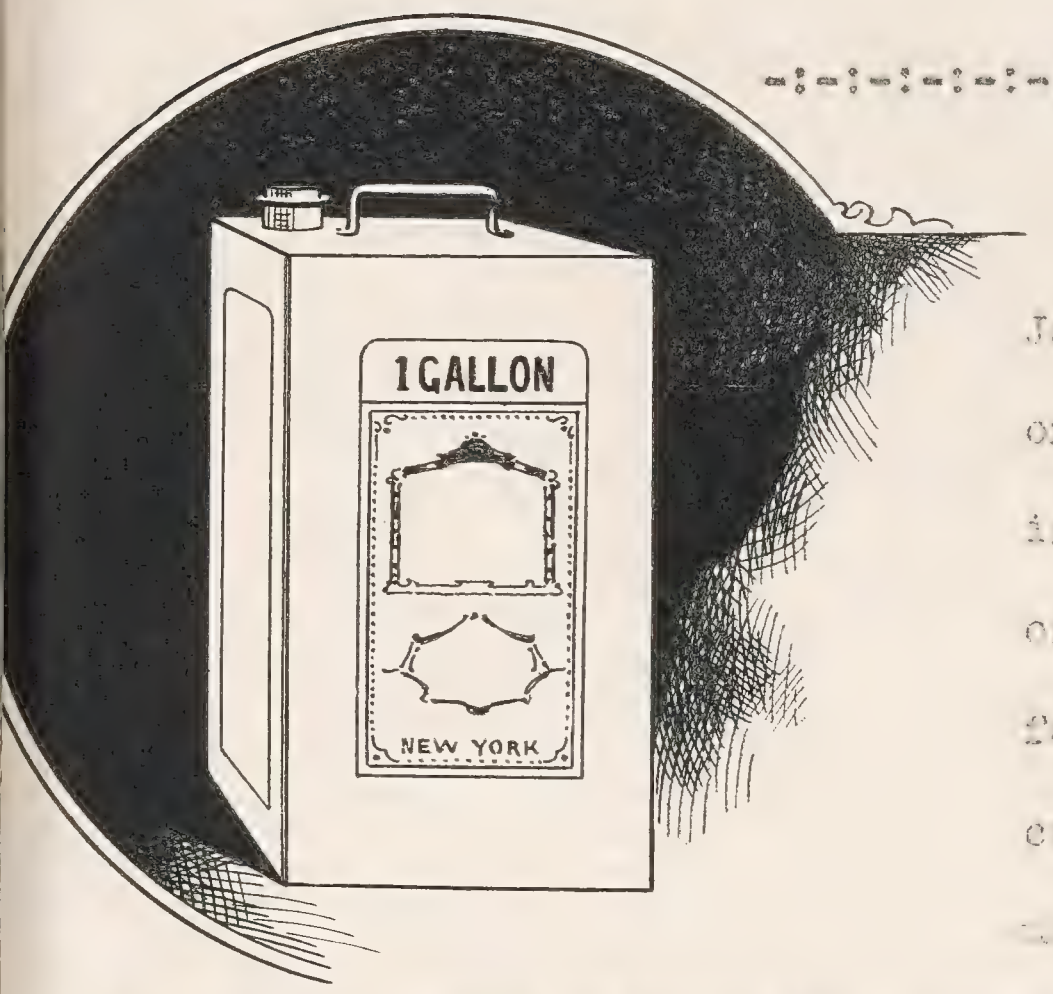

Under the general name of Japans are comprised varities of oxidizing compounds for hastening the drying of either a Paint or a Varnish. This article is far from being a well defined composition, and it would be useless to try to find, in the market two brands made alike; and this simply from the reason that every varnish maker has his own ideas as to what is, or what should be, a faultless Japan.

Amongst the most common names given to this article, and the processes used in manufacturing it, are to be mentioned:

GRINDING JAPAN, COACH JAPAN, DARK JAPAN, ASPHALTUM JAPAN, BROWN JAPAN, and GOLD SIZE JAPAN.

All sorts of Japans that are made today can be classified in two divisions: BROWN JAPANS and GOLD SIZE JAPANS.

The consumption of Grinding Japan, especially intended for grinding colors which have to be used in fine carriage painting, is so large in this country, that now brands of this article make

their appearance every day.

A strictly first class Japan, such as used exclusively for grinding colors intended to be used in fine carriage painting, must fulfill the the following requirements:

1st. IT MUST DRY QUICKLY.

2nd. IT MUST SET HARD AND BE STRONGLY ADHESIVE.

3rd. IT MUST DRY THOROUGHLY, NOT SUPERFICIALLY.

4th. IT MUST BE ELASTIC ENOUGH NOT TO CRACK WHEN DRY.

5th. IT MUST MIX WITH LINSEED OIL IN ALL PROPORTIONS.

The elasticity is one of the most important requirements of a good Japan, which must, like Linseed Oil, stand all the contractions and expansions which result from the various changes of temperature.

Non-Elastic Japans, and there are a great many in the market, either crack, blister or peel off in a short time.

In Chapter XI of the SCIENCE OF VARNISH MAKING, will be found under the heading of the VARNISH MAKER'S LABORATORY AND EXPERIMENTING DEPARTMENT, some practical tests very useful and simple to ascertain the elasticity of a Japan and its affinity for oil.

Owing to the numerous details of the process for making a "Batch" of good Japan, I give hereafter an elaborate description of every phase (twenty in number) of the operations, from the Melting to the Thinning Down.

#1020.

STANDARD FORMULA, METHOD AND PROCESS FOR MAKING

A "BATCH" OF BROWN JAPAN.

PREVIOUS OPERATION. HEATING THE OIL.

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This process is probably the best in existence and the at the same time the simplest for making a Brown Japan or a Grinding Japan fulfilling all the requirements of the grinder of Japan colors. The result is a grinding Japan possessing great body, intense oxidizing power, and fully up to the highest standard imported from England.

The entire process can be divided into 20 different operations, which we will describe, each one of them separately, so as to enable any Varnish maker to make a "BATCH" and get good results by simply following the instructions.

PREVIOUS OPERATION: The day before making a "Batch" of Grinding Japan heat in an iron kettle as many times thirty gallons of Raw Linseed

oil as you intend to make "BATCHES" of grinding Japan the day after. The object of this is to produce a previous bodying of the oil. The raw Linseed Oil needs to be heated from 200 to 250 deg. F. in the iron kettle the day after. Let it stand in this kettle over night.

CALCUTTA LINSEED OIL should be used in preference to American Linseed Oil for making Japans.

As the object is to produce a very intense oxidizing, the oil should be free from mucilage and fatty acids as much as possible; and this is the only reason why CALCUTTA LINSEED OIL is preferable.

In making Japans from the the use of a Fresh Linseed Oil which has not been allowed to settle sufficiently so as to eliminate what is commonly named "FOOTS", it is impossible to combine the maximum of hardness and oxidizing in the finished product.

Consequently, if you use AMERICAN LINSEED OIL in making Japan, you must be sure first that the "FOOTS" have been eliminated.

COMPLETE INSTRUCTIONS FOR MAKING A "DATCH" OF GRINDING JAPAN.

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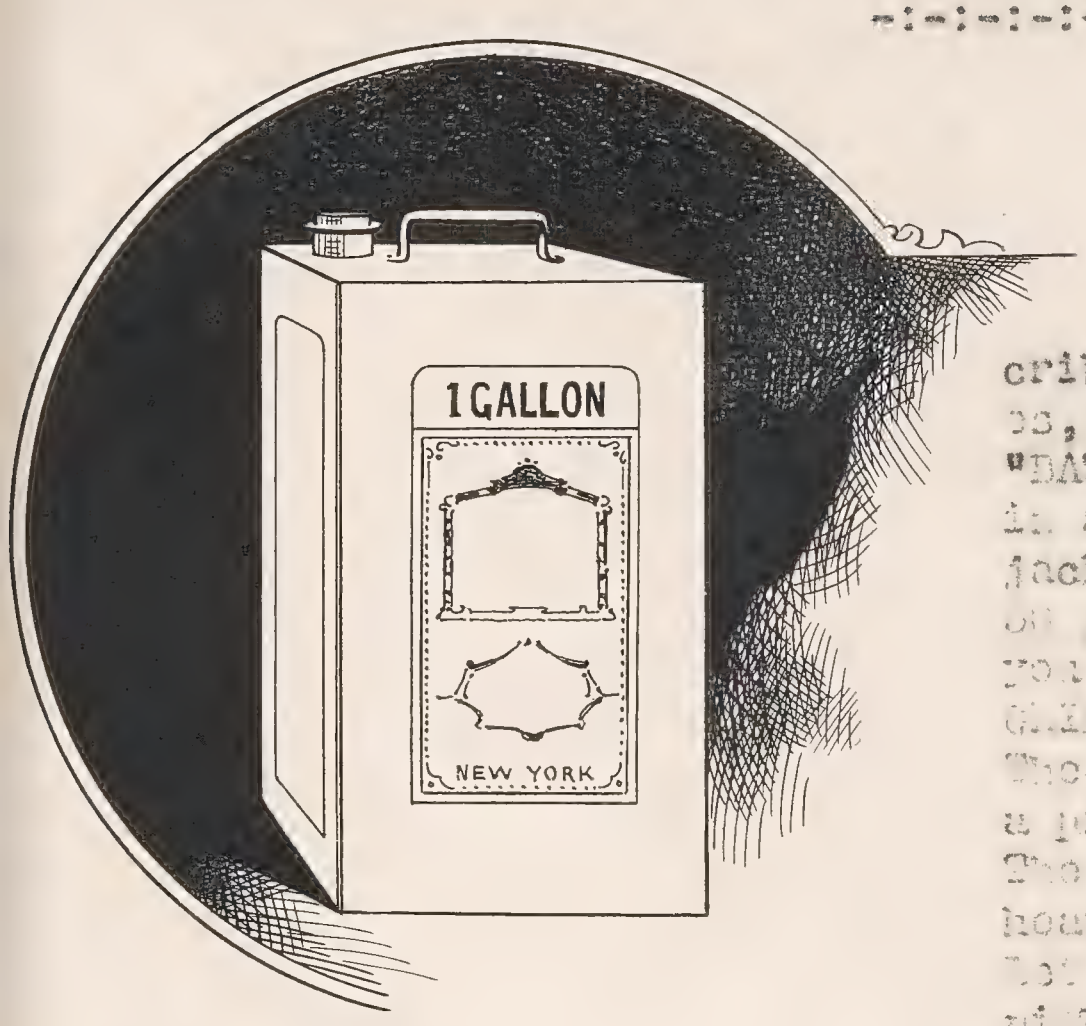
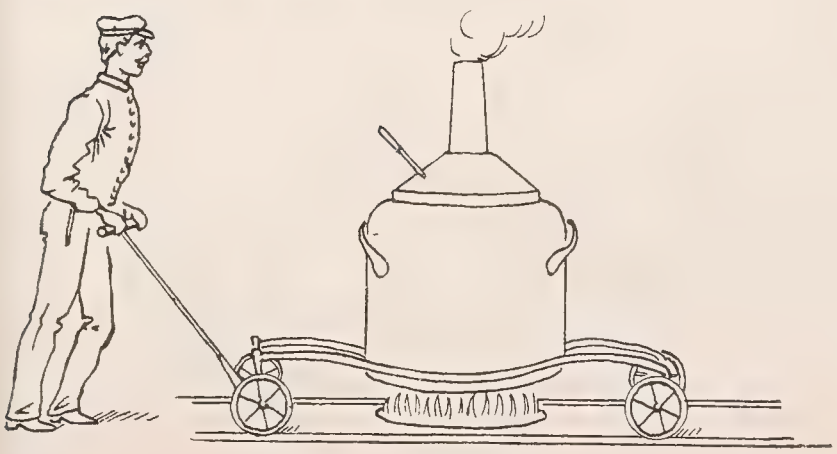


PREVIOUS OPERATION

As it has been already described in the 2 previous pages, the day before making a "DATCH" of GRINDING JAPAN, heat in an iron kettle or in a steam jacketed kettle, as many times of gals. of raw linseed oil as you intend to make "DATCHES" of GRINDING JAPAN the day after. The object of this is to produce a previous boiling of the oil. The raw linseed oil needs to be heated from 300 to 350 degs. F. Let it stand in this kettle overnight for use the day after, and the day after, proceed as follows:

1st. . . Weigh exactly:

Two lbs. No. 3 KAURI GUM. Place this amount of gum in the varnish kettle. A better Kauri Gum, such as K, KK or KKK Kauri could be used but as in making Brown Japan the color is irrelevant, and use of an inferior grade Kauri will not affect the quality of the result.



2nd. . Place the cover on the cup or kettle with an iron stirrer through it, and bring your kettle and contents on a fire well lighted and free from smoke, free from flame. (This last point is very important.)

The heating should be conducted slowly and at a temperature [illegible].

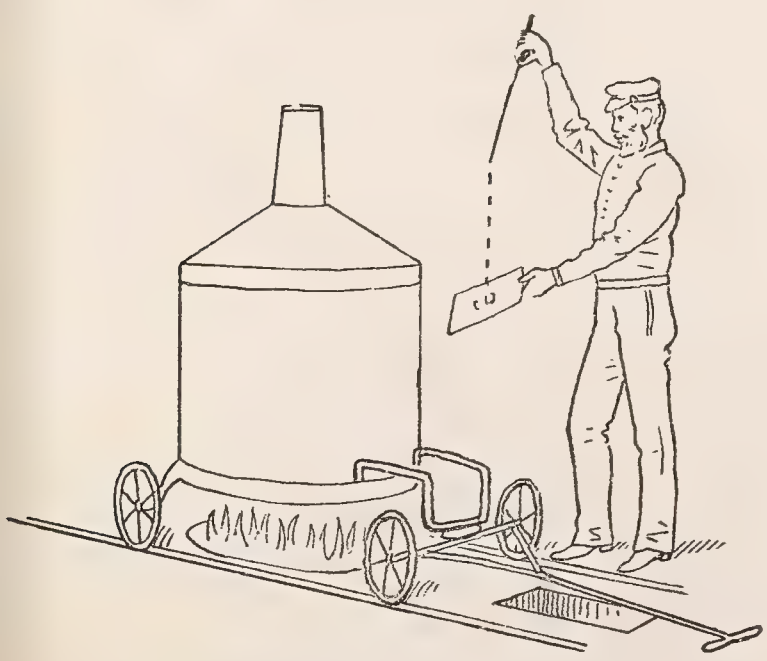
THIRD OPERATION:

3rd. . . Under ordinary circumstances, the melting of a Kauri gum will require about half an hour to become perfectly liquified, providing that the operator helps the action of it by using the iron stirrer briskly, passing through the cover of the kettle. By scraping with the iron stirrer the bottom of the kettle upon which the gum is melting, the danger of over-heating or burning the gum can be avoided and the mass enters in fusion uniformly.

FOURTH OPERATION:

4th . . . As soon as there are no lumps of Kauri gum in a solid state in the kettle, which is easily noticeable by the use of the stirrer, allow the liquified resin gum to stand five minutes longer, or more if necessary, until all the dampness of the gum or the volatil matters will be evaporated and no white fumes will be produced at the top of the hood or cover. Then stir the gum again as to fluidify, using the stirrer as follows:

FIFTH OPERATION:



5th . . . Raise the iron stirrer out of the kettle, removing it quickly from top to bottom and [illegible] through the cover; and holding with the left hand a piece of [illegible] paper; with [illegible] the operator whether or not the Kauri [illegible] perfectly fluid state.

SIXTH OPERATION:

6th. During the time that the Kauri Gum is melting, you must proceed to the proper heating of the Linseed Oil that you left in the Steam Jacketed Kettle over night after having heated it as you did the day before.

The Oil should be heated over again at a temperature of 300 to 350 deg. F., after which it is in the proper condition to be added to the melted Gum.

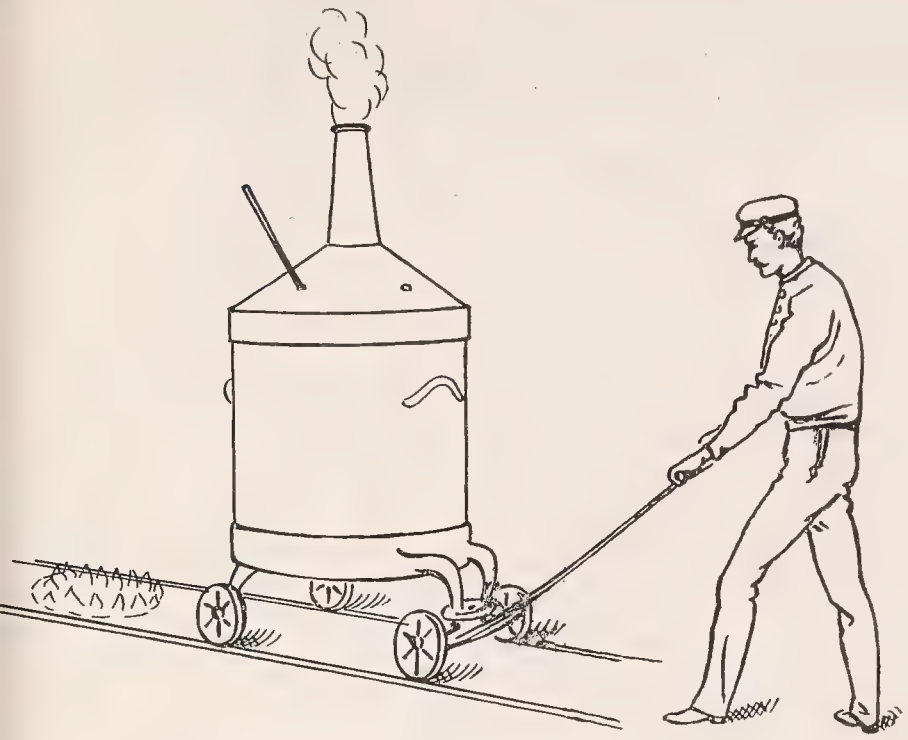
It is very important not to add Linseed Oil until the Gum perfectly liquefied by heat, and especially when the LIGHT & POLE of this Gum is used.

As in this case we have developed a temperature of 450 deg. F. to bring the 100 lbs. of Kauri No. 3 into FUSION, the discrepency of temperature would be such if we had cold Linseed Oil, that partial solidification of the preparation would be the result. For this reason, before adding the Linseed Oil to the melted Gum, it should be heated from to 300 to 350 deg. F.

SEVENTH OPERATION:

7th. Now introduce take from one stock or of gals. of Oil already heated to a temperature of 300 deg. and heat in the steam jacketed kettle, the amount of 5 gals., and carry it in an oil measure into the larger kettle which is standing on fire, using a copper funnel through the hole of the cover. Stir briskly Oil and Gum, so as to incorporate them intimately together; and when this is done, allow the mixture of Oil and melted Gum to stand on fire fifteen minutes longer.

EIGHTH OPERATION:

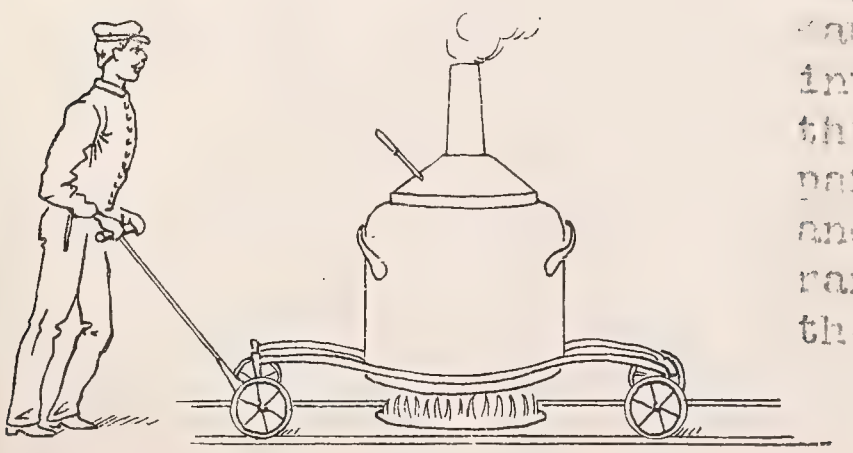


8th. . . The Oil and Gum being intimately incorporated, draw your kettle three to four feet out of fire-place so as to let the preparation simmer gently through the heat which radiates from the furnace. Only five gallons of previously heated Linseed Oil should be added to the melted gum while the copper kettle is standing over the fire-place; and the next quantity of oil should be put in the kettle while this kettle has been removed from the fire.

NINTH OPERATION:

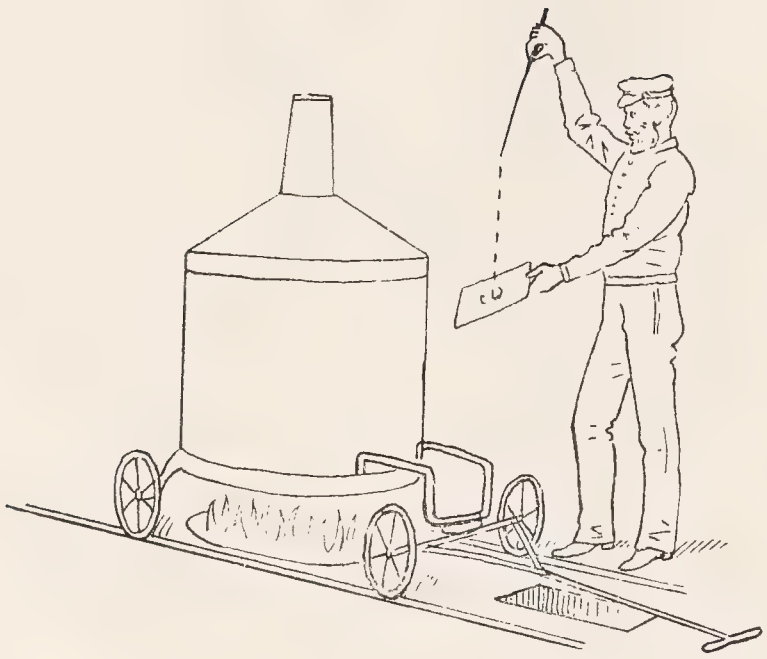
9th. . . The kettle having been removed to a distance of about three feet from the fire, take from the steam jacketed kettle, five gallons more of Linseed Oil previously heated to at least 300 deg. F., and carry it with an Oil measure into the Copper Kettle, through the Copper funnel inserted in the cover. Use the iron stirrer so as to incorporate these five gallons thoroughly with the preparation, and addgradually five gallons at a time and in the same manner the remaining part of the oil from the steam jacketed kettle.

TENTH OPERATION:



10th. . . We have now in the Copper kettle, 100 lbs of melted Gum and 30 gals. of Linseed Oil, intimately incorporated. The next thing to be done is to carry the preparation over the fire-place again and cook together at a temperature ranging between 475 to 500 deg. Fah., the melted Gum and the Oil.

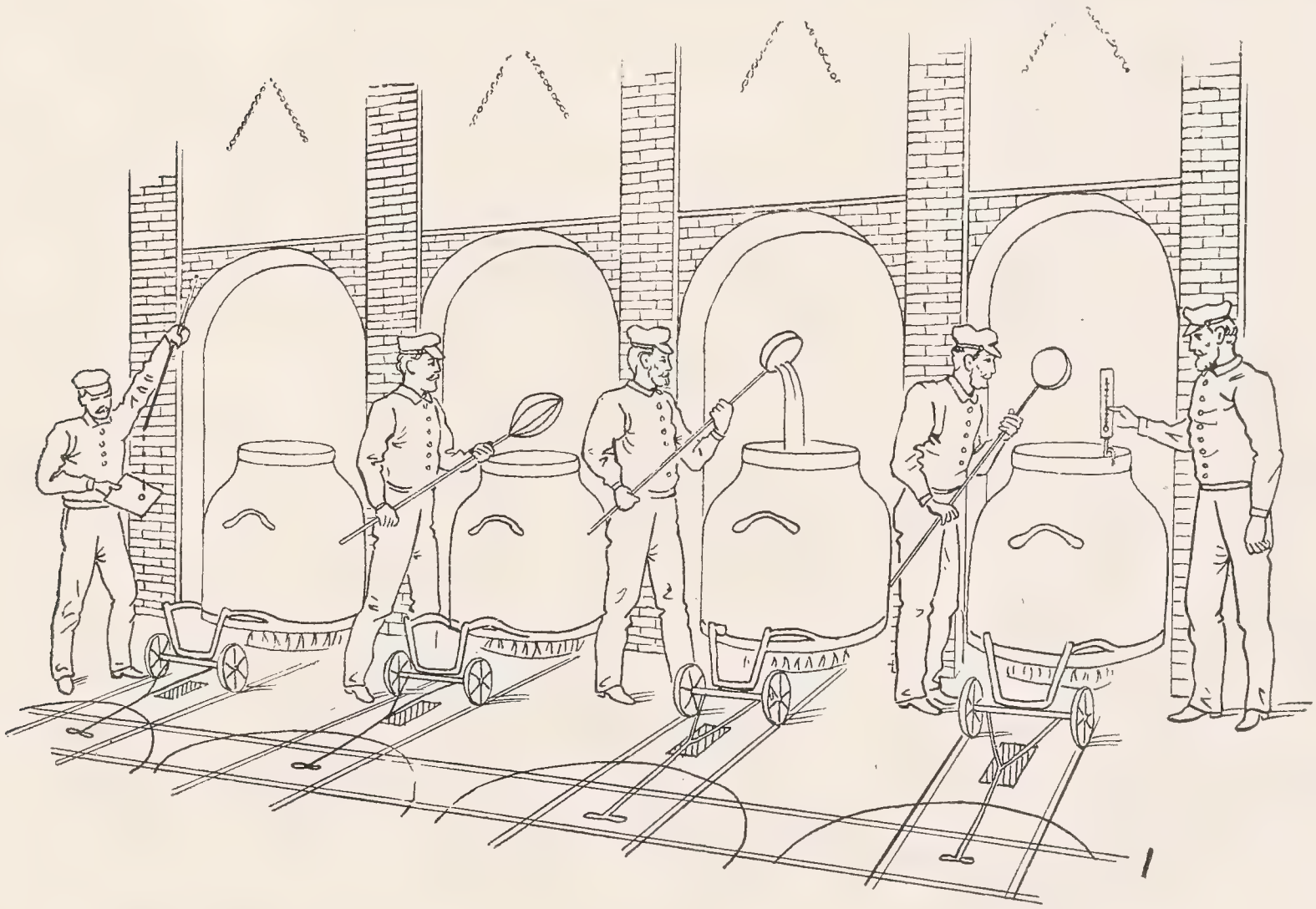
III. SWITCH OPERATION:



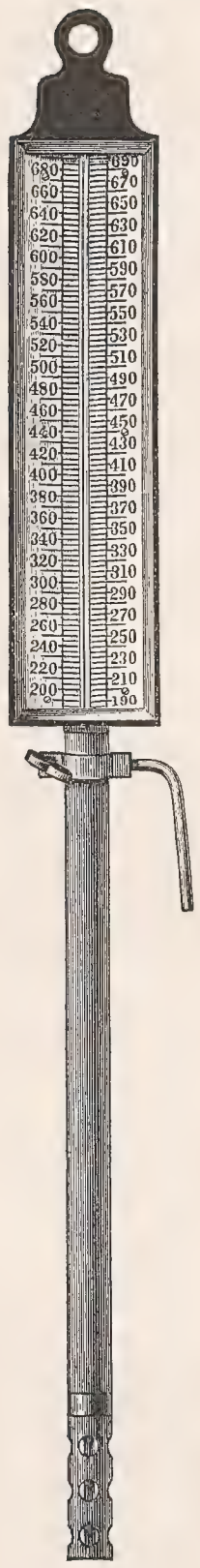
11th . . Make use once more of the iron stirrer, removing it quickly from the proportion can of the kettle and holding it in the left hand a piece of window glass; let a few drops run from the stirrer on the surface of the glass and watch if the incorporation of oil and gum is perfect. If it is, remove the cover from the kettle.

NEXT IN PLACE:

12th. . . The cover haven't been removed from the kettle, the next thing to do is to increase the temperature so as to commence the BOILING in up n kettle.



Your "DARCHEN" can be conducted at a time with proper facilities.



lot. . . The moment has come to make use of the thermometer so as to regulate the heat according to the instructions further on given until the end of the operation.

The best temperature to use for producing a thorough emulsion of Kauri, melted in the proportion of 100 lbs. with 60 gallons of Linseed Oil, is 475 Deg. Fah.

The cooking should therefore be conducted at a temperature not exceeding 500 deg. Fah., and not lower than 475 deg. Fah., until the moment when the preparation will have cooked sufficiently to be ready for the process of thinning.

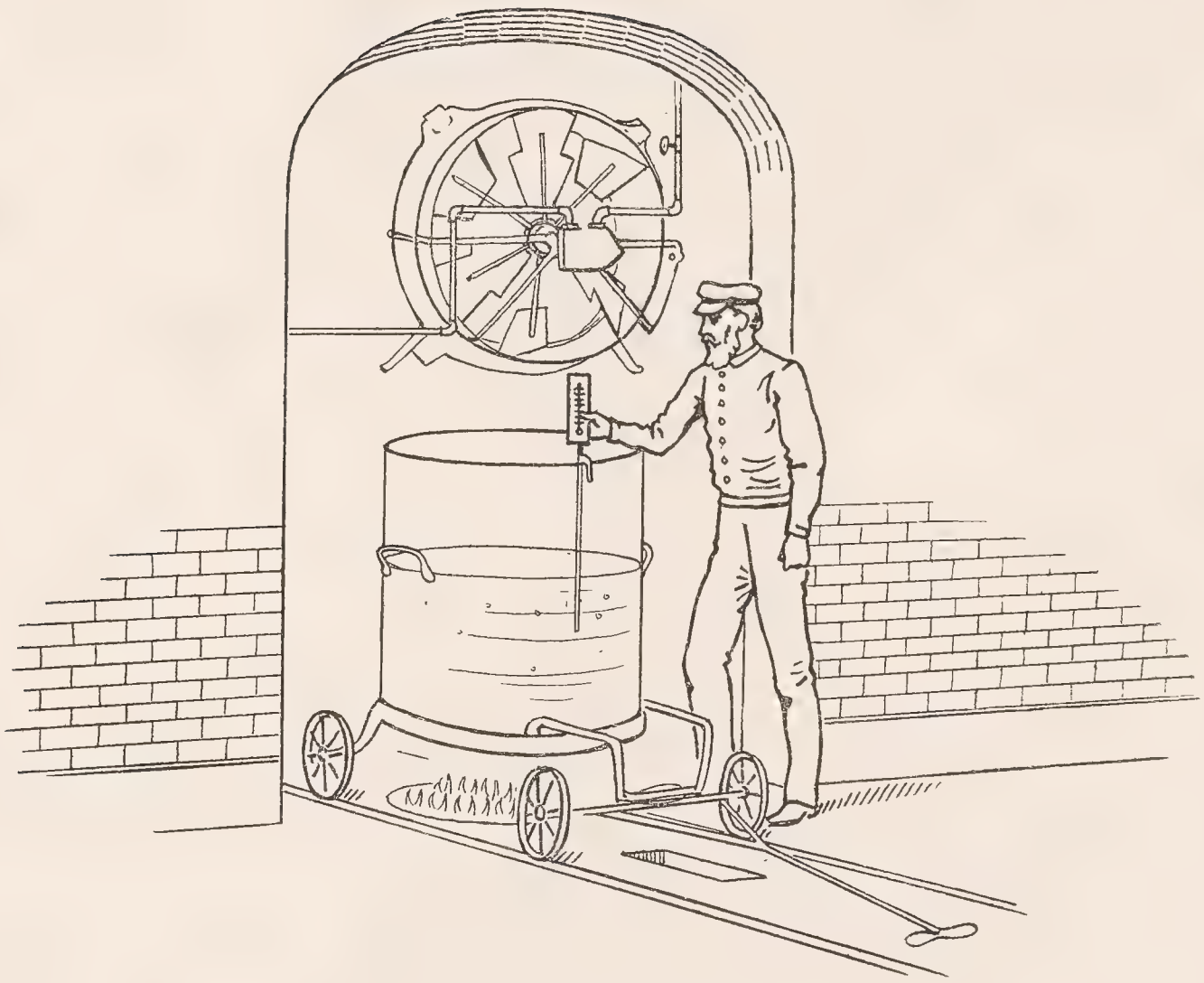
Let be ore going further, the preparation must be allowed to simmer gently on the fire for about half an hour; it is very important in making a "varnish" of Japan to let the cooking of linseed oil and Kauri gum continue until these two materials are so well combined together that the aspect of the preparation is rather like that of the oil, which happens generally in twenty-five to thirty minutes of cooking at 475 or 500 deg. Fah.

Until now it may be noticed that the copper kettle has been entirely covered; and in order to keep close by a modification take place in the general aspect of the preparation, it is necessary now to remove the cover as there is no longer use for it; nor for the iron stirrer; but for the thermometer exclusively until the moment when the preparation shall be ready to receive the charlock.

The cover having been removed, the preparation is now ready for the next operation.

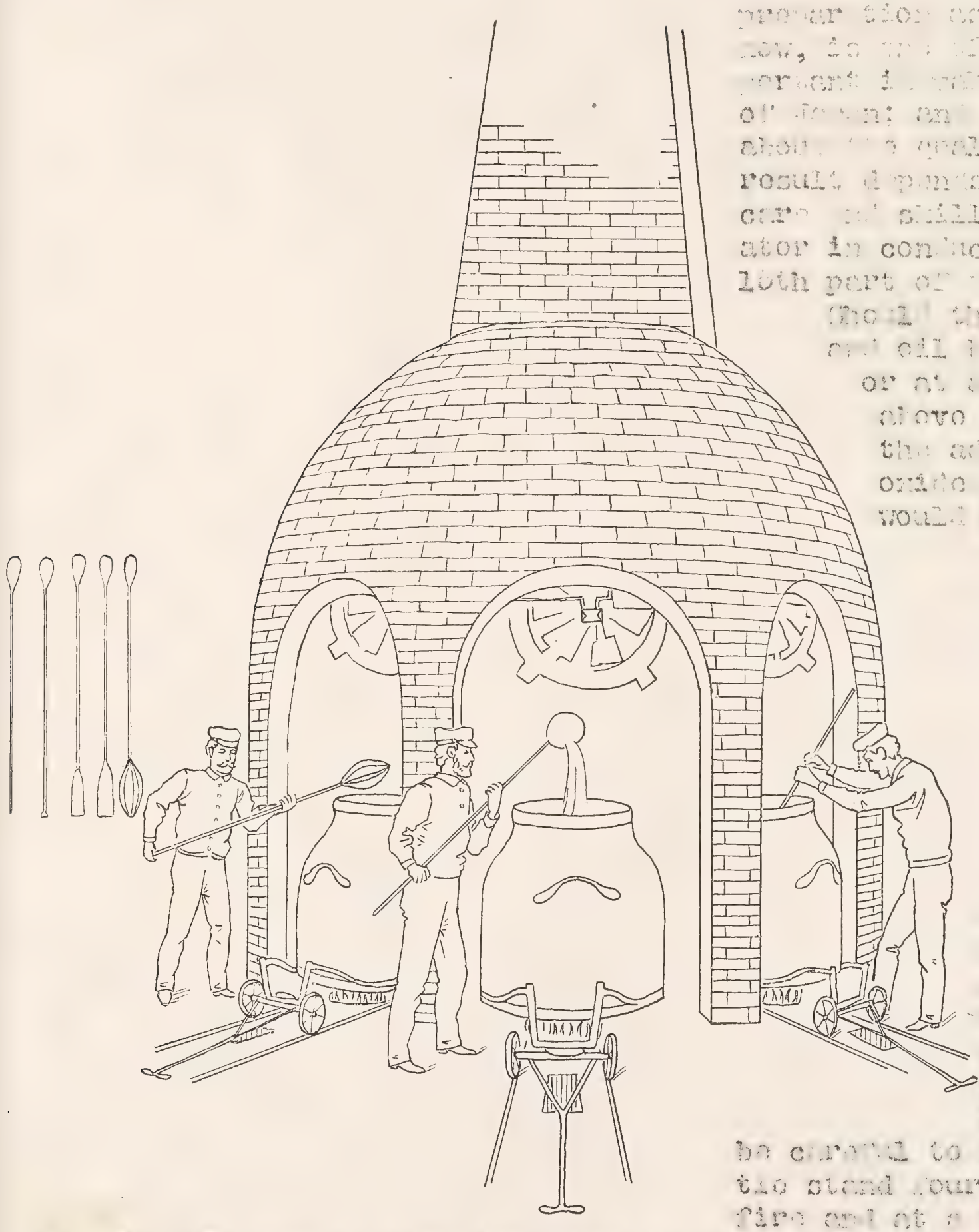
FOURTEENTH OPERATION:

14th. . . It is very important now in what will follow to watch constantly the progress of the operation, and the action of the temperature, as too much heat would at this stage of the operation have an injurious effect upon the working properties of the final result and especially upon the elasticity of the gum. Upon the particular time that between twenty-



five minutes at a temperature of no less than 470 deg. F., and not over 500 deg. F., it should be removed from fire and allowed to cool down to 400 deg. F. so as to put in the oxidizing chemicals, as per instructions hereafter given. The oxidizing chemicals should never be put into "MATCH" or Rubber at a temperature above 400 deg. F.

FIFTEENTH OPERATION:



16th . . . The addition of chemicals or oxidizing agents to the preparation as a stimulant, is one of the most important operations in making "white" of iron; and a great deal depends upon the quality of the result depends upon the care and skill of the operator in conducting this 16th part of the process. Should the molten iron and oil be too hot, or at a temperature above 400 deg. F., the addition of an oxide of manganese would produce an instantaneous ignition or soon as this will reach the surface of the preparation in the bottle so be careful to let your bottle stand four feet from fire and at a temperature of only 400 deg. F. When the oxide of manganese is to be put in. When you are sure that the proper preparations have been taken, put in lbs. of granulated manganese very slowly in your bottle and keep constant stirring, using no longer a stirrer, but a whip to subdue the froth then produced. The manganese being all put in bring bottle over fire again to conduct the COOKING as per out.

SIXTEENTH OPERATION:

16th. . . Take your thermometer again, watch the temperature and increase it until it reaches 160 deg. F.

If your watch [illegible] of [illegible] the [illegible] at this moment you can see the bronze froth first produced abundantly by the [illegible] [illegible] [illegible] become clearer in color and gradually disappears.

[illegible] use of the whip is necessary to subdue the froth every time that owing to the effect of the heat, it is easily produced and that there is danger of the effervescence running over.

When the froth has completely disappeared and the surface of the preparation becomes visible, draw the kettle from fire only two feet, and pour into the kettle slowly one pound at a time, spreading it over the surface with a large scoop:

TO LBS. LITHARGE.

Mix thoroughly with the whip and in 10 minutes after add to the preparation:

10 LBS. OF RED LEAD.

A great froth is again produced, which is very dark at first, then turns a walnut color and becomes lighter gradually. Treat the froth as soon as produced, and when it is down bring kettle over fire again to continue the cooking.

Half an hour later add to the preparation and while the temperature is at 160 deg. F.

[illegible] LBS. OF BOILED OIL.
after having removed kettle from fire.

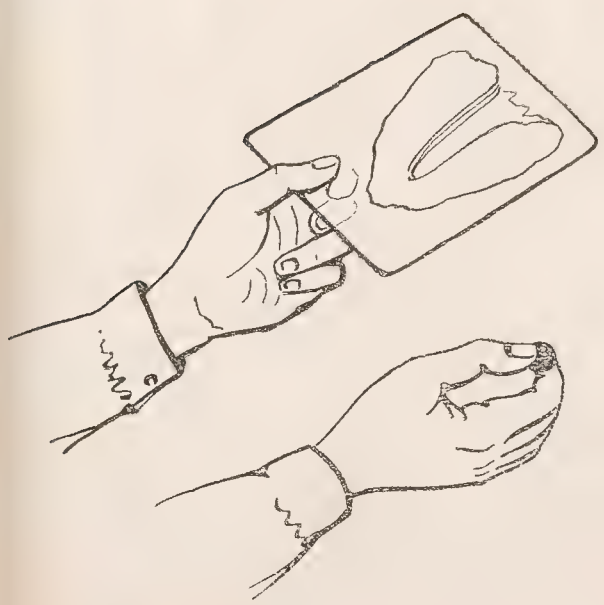
By watching the surface of the mixture at that moment, it can be noticed that it clears out. Bring your kettle over fire again, raise the temperature to 500 deg. F. until the proper bien thickness progressively. Now if you desire to see how the operation is proceeding, remove the thermometer, make the mixture cool to touch so to finally on a piece of paper.

Gradually the globules in boiling become larger, which is an indication that the liquor preparation progresses; and if you wish to know just how far it has advanced, place the cover over the kettle again and pass around the cover a long iron spatula; dip the spatula into the preparation.

Now proceed as follows:

17th. . . Remove quickly the iron spatula from the bottom so as to let the preparation run in little streams from the spatula over the surface of a piece window glass previously placed in cold water. If the [illegible] nearly cold, [illegible] will solidify on reaching the cold surface of the window glass, leaving plastic enough to roll in [illegible] by slight pressure between the fingers.

Proceed as follows:



18th . . . The pill thus formed must become very hard in cooling. If it is not hard enough, the pills can easily be brought over the fire with the [illegible] [illegible] . [illegible] [illegible] lished to act entirely upon a [illegible] been completed.

NINETEENTH OPERATION:

19th . . . If the Japan is intended to be made not exceedingly hard but rather elastic, it is better than not to continue the cooking until the pill formed as per description already given has not become too hard by solidifying. If on the contrary, hard gloss is the main thing aimed at in a Japan, then prolong the operation of cooking until the pill produced by pressure between the fingers may be as hard as a stone.

At this moment remove the kettle from fire and carry it out of the melting room for the last operation of thinning down.

[illegible] OPERATION:

20th . . . After allowing the preparation to cool down for about 10 of 15 minutes, so as to permit the addition of a cold volatil thinner, then send to the kettle and under constant stirring:

50 Gallons of Turpentine.

If a more economical product is desired, instead of thinning down with turpentine, thin down with Naph tha or with a mixture of the two in in the proportion of 50 % of each.

According to the special kind of thinner or thinning preparation that has been used, the peculiar characteristic of a Japan can be modified as it is explained hereafter

#1040.

IMPORTANT REMARKS CONCERNING THE MODIFICATIONS WHICH TAKE PLACE IN THE PECULIAR CHARACTERISTICS OF A JAPAN THROUGH USE OF DIFFERENT

D I L U E N T S O R T H I N N E R S.

-:-:-:-:-:-:-

If instead of using Turpentine or Naphtha, or a mixture of the two, in thinning down a "BATCH" of Varnish, the Varnish maker uses special thinners, it is then possible to modify at will the peculiar characteristics of a Japan and render it more elastic, more adhesive, softer, harder, heavier in body, more glossy, according to the purpose for which it is intended.

THINNING DOWN WITH CAMPHORATED TURPENTINE OR NAPHTHA

The thinning down of a Japan made according to the process method and formula just described instead of thinning it down with ordinary Turpentine or Naphtha, will renderstho finished product much more elastic and adhesive to the surface upon which it may be

applied. As to the drying power, it remain unchanged.

THINNING DOWN JAPAN WITH RUBBER OIL.

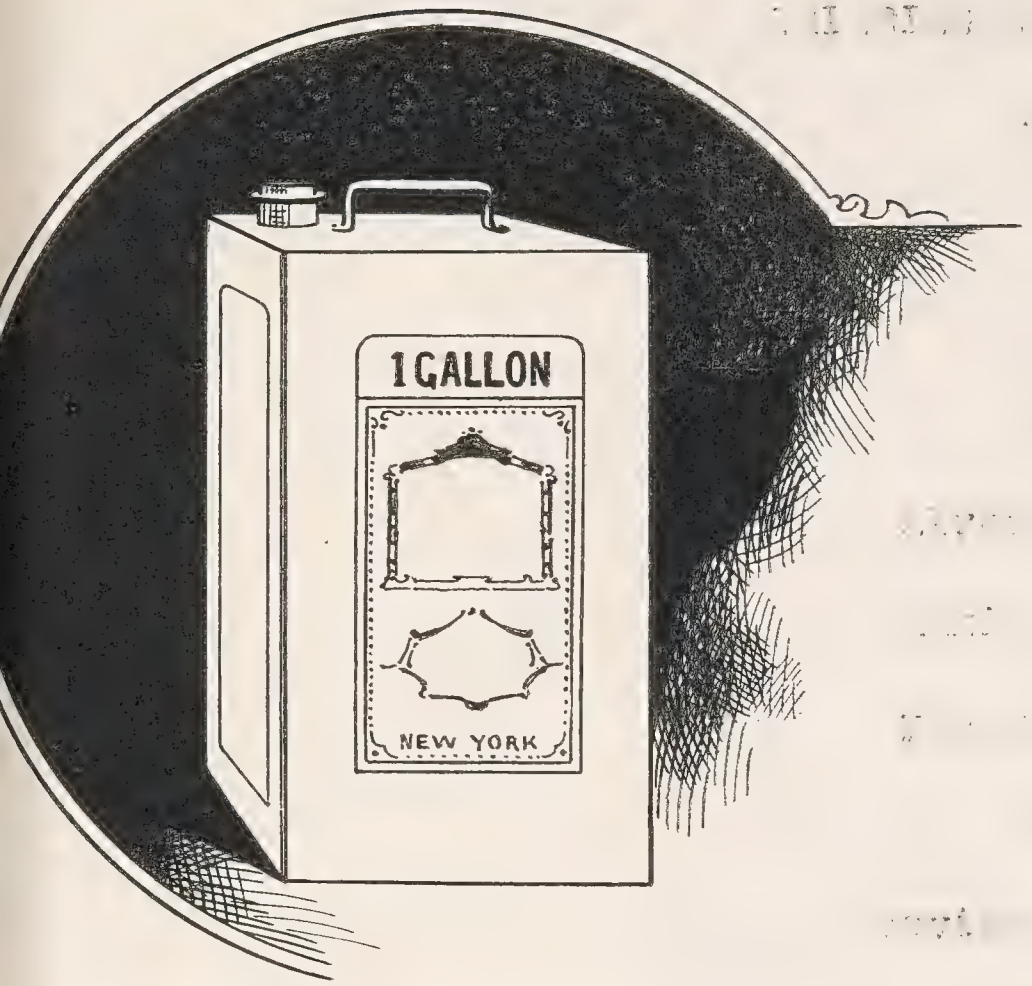
If instead of thinning down with Turpentine or Naphtha, the Japan is thinned down with a solution of Rubber and the above diluents and commonly named RUBBER OIL, the adhesive power and also the elasticity of the finished product is greatly increased; but a Japan thinned down in that way while it stands admirably outside exposure, is unfit for use in the particular case of Japanning or baking, on account of the softening effect of fire upon the rubber.

INCREASING OR

REDUCING THE

PROPORTIONS OF THINNERS

By increasing the proportions of ordinary Turpentine or Naphtha, the gloss of the Japan decreases; when the proportion of thinners is reduced, there is an increase of the adhesive power in the finished product.


1 GALLON
NEW YORK

MANUFACTURE OF JAPAN FROM OIL EXCLUSIVELY, WITHOUT THE USE OF GUM.

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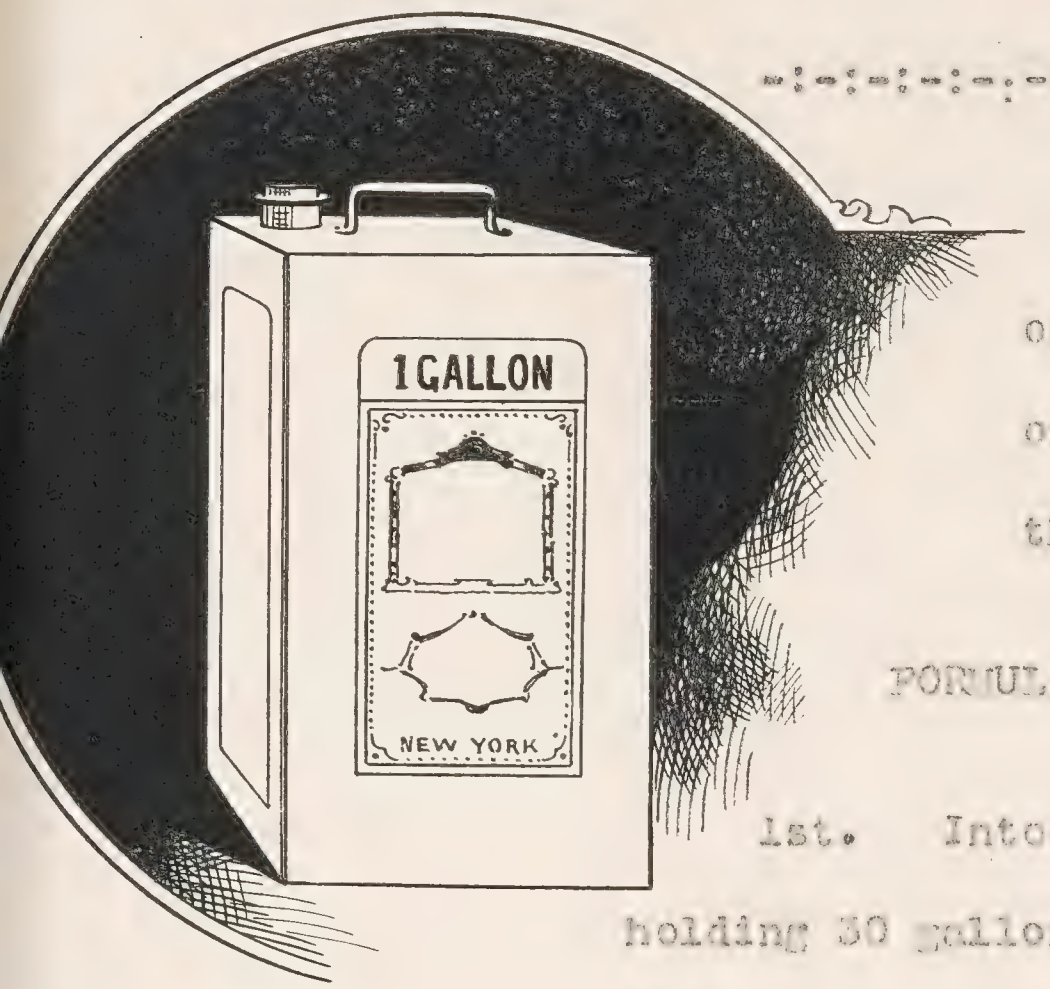

According to the capacity of your kettle, the proportions of chemicals and ingredients in this formula should be regulated.

FORMULA AND PROCESS.

1st. Into a pan or boiler capable of holding 30 gallons, put 4 gals of Raw Linseed Oil.

2nd. Let simmer gently for an hour; then add, gradually, a little at a time, 14 lbs. of Red Lead. Stir constantly.

3rd. Let it boil until all the Red Lead is taken up, which will take over an hour.

4th. When all the Red Lead is taken up, and the liquid has turned a brown color, take samples out from time to time and cool them on a piece of glass.

When the samples can be rolled up into the form of pills, the liquid has boiled long enough. If it will not roll into pills,

add a little more Red Lead. The harder it is boiled, the quicker it will dry.

5th. At this stage of the operation, dissolve in the hot liquid 8 lbs. of Rosin M.

6th. Continue the cooking of rosin and oil for about half an hour.

7th. Add to your kettle a little gum camphor, not over 1/4 of an ounce for the proportions named.

8th. As soon as the camphor has been dissolved, which does not take a minute, look at the preparation; and as soon as you see it has a tendency to thicken, which happens in about fifteen minutes, remove kettle off fire.

9th. Allow to cool about an hour, and when you see the preparation assuming a degree of consistency as thick as treacle, stir it until well blend with 10 gals. of hydrocarbated Benzine., made as per instructions already given.

10th. Allow to cool and the operation is practically ended. If you operate on larger quantities, the last operation consists in sending the Japan, when cold, through the filter press, where it acquires through clarifying a finish and transparency not obtainable otherwise.

MANUFACTURE OF GOLD SIZE JAPAN.

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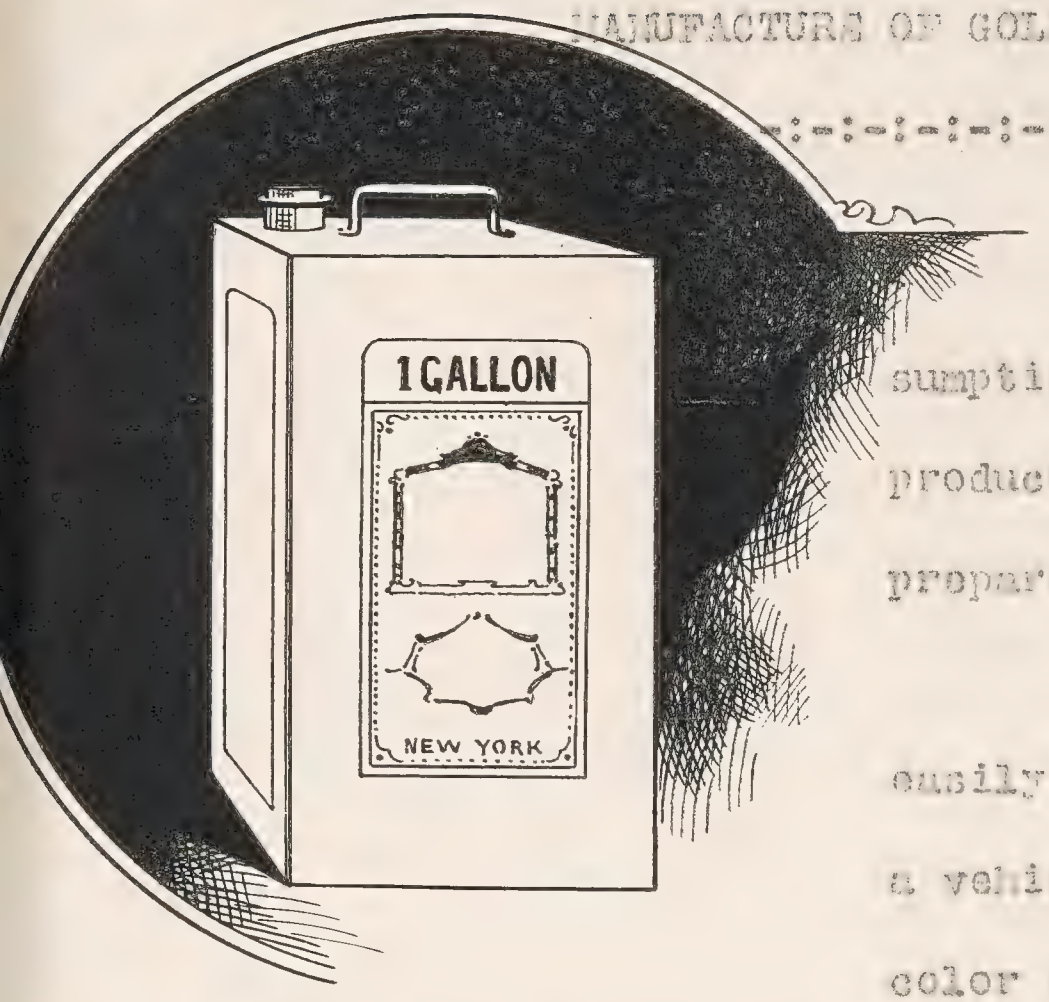


There is a very large consumption of Gold Size Japan in the production of light colors, especially prepared for fine carriage painting.

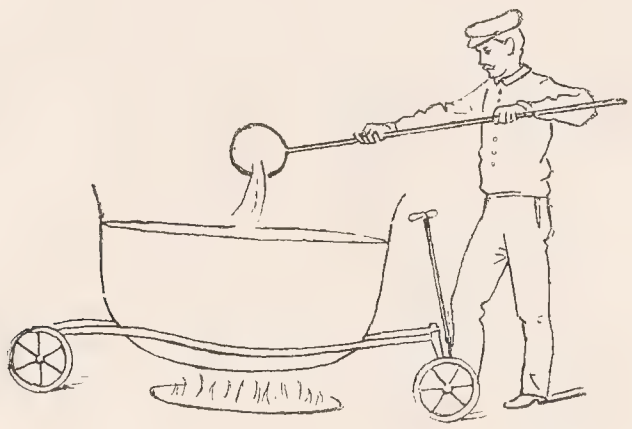
A Brown Japan, as may be easily understood, cannot be used as a vehicle for grinding an intense color as light as chrome yellow; the Brown Japan will darken the color to such an extent that its brilliancy would be spoiled; therefore, it has been found necessary to use a Japan much lighter in color; and many attempts have been made to obtain a product almost colorless.

The best results known up to date in the direction of Gold Size Japan were obtained in England by Varnish makers of a world-wide reputation and who are selling their goods in this country. Any experienced Varnish Maker has had occasion to test and compare his own Gold Size Japan with those made by Harland, Nobles & Hoare, G. Rowney & Co., of London.

We give hereafter a process by which a most beautiful Gold Size Japan can be made.

FORMULA AND PROCESS.

In a 300 gal. iron kettle such as generally used for making Japans and Driers, put 40 gals. of RAW LINSEED OIL and preferably CALCUTTA OIL. Heat your Oil to a temperature of 350 deg. F.; then add to it 200 lbs. of WATER WHITE ROSIN previously hardened and neutralized by the same process as making FRENCH ARTIFICIAL MAURI. Increase the heat just enough to get your rosin thoroughly dissolved in the oil. Now allow to cool to 170 deg. F.

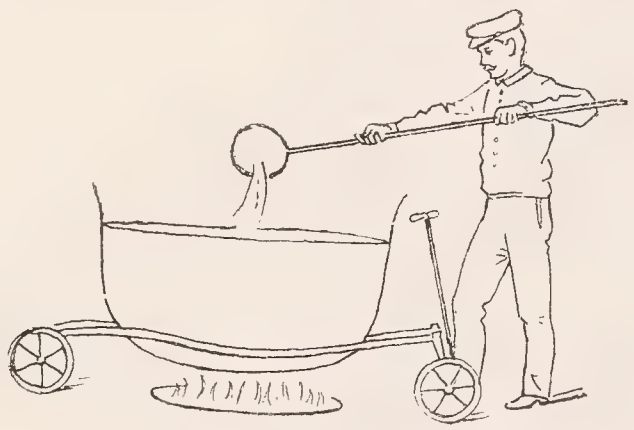


At this stage, take the kettle from the fire and add to it gradually and with the necessary precautions, a mixture of oxidizing agents previously prepared separately in a porcelain lined kettle. This mixture is made simply by adding 20 lbs. of NITRIC ACID (38 deg) to 50 lbs. of BLACK OXIDE OF MANGANESE diluted with just enough water to mix readily with the acid. This is your oxidizing preparation which is to be carried into the kettle.

Increase your heat to a temperature of 300 deg. F., then

add gradually the oxidising mixture; put it in only 25lbs. at a time, a little more or less. An abundant froth is immediately produced; it must be subdued with a whip. In order to prevent the preparation from running over, it is prudent to keep the kettle out of fire so as to get a temperature ranging from [illegible] to 325 deg. F., but not higher until all the oxidising compound has been put in and the froth entirely subdued.

At this time the preparation will look very dark in the kettle; a little drop of it on a piece of window glass will solidify very slowly, presenting a yellowish orange color.



If by smearing it on a piece of window [illegible] with the finger the preparation shows no tendency to solidify, it is proof that it has not been cooked long enough; put on fire again and when in the proper condition add to it gradually 25 lbs. of LITHARGE OXYGENE; raise the temperature to 450 deg. F.; cook until the Lead Oxide has all been taken up; then cool down and add to the preparation 1[illegible] gals. of AMPHIBOLIC TOLU RESINE and immediately after 21 gals. of Carbureted Naphtha.

When a lighter color is desired, there is another operation to perform before thinning down; and this is the addition of 10 gals. of HEAVY BODY VARNISH OIL intensely oxidized with Borate of Manganese.

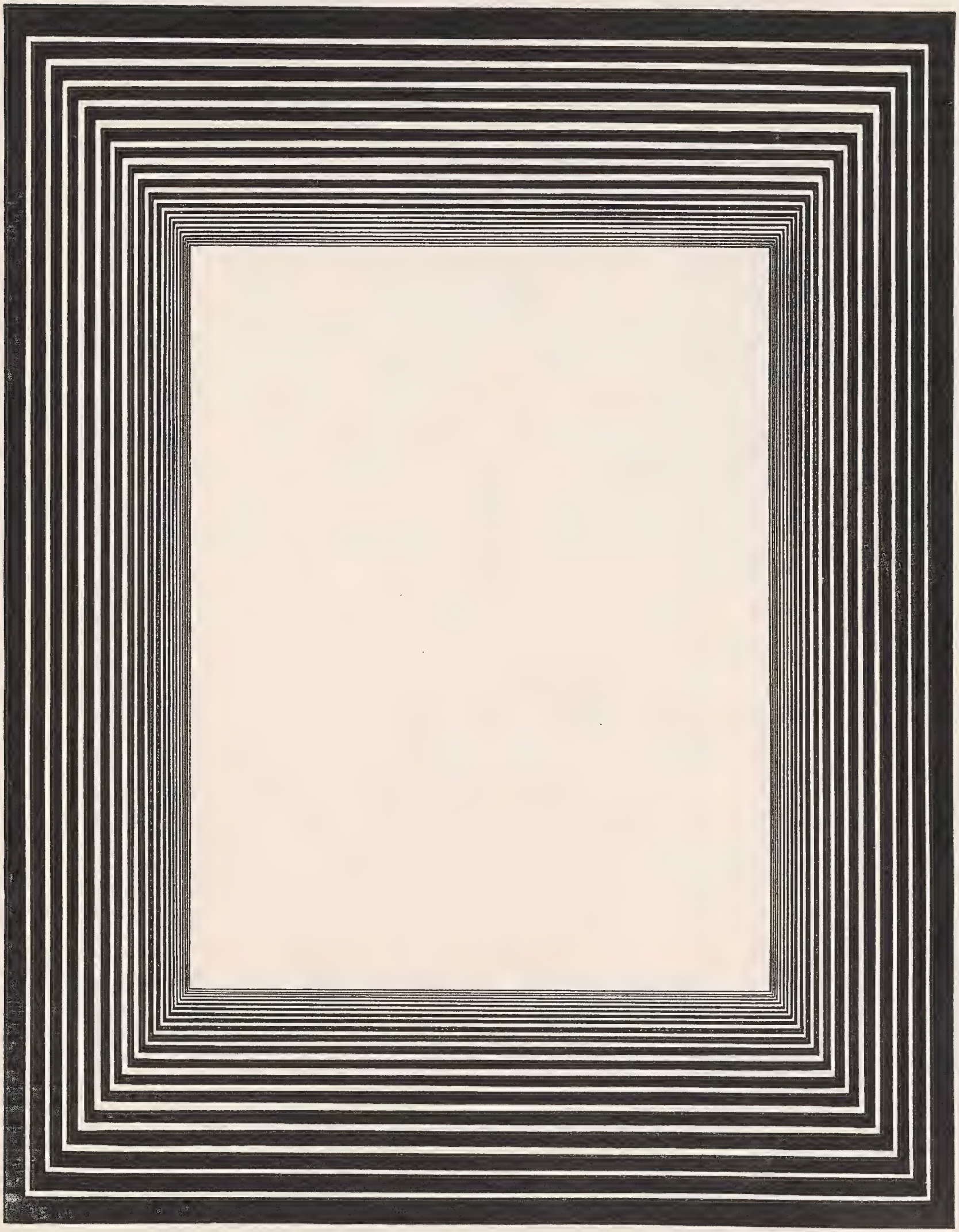
Instead of using Varnish Oil, some manufacturers add 10 gals. of LIGHT COPAL VARNISH or QUICK RUBBING VARNISH.

According to the ingredient which has been added in that manner before thinning down, the Japan is also in a greater content; that is, in the case when an oil has been added; and much harder, quicker drying, but not so elastic when Copal Varnish has been added.

The beautiful finish or better said the very fine appearance, color and transparency of the English Cold Pine Japans, is not entirely due to their proportion. It is only by the use of a filtering press and three thicknesses of filtering paper that a Cold Pine Japan can be thoroughly clarified, separated from insoluble matters, and rendered perfectly transparent. A Cold Japan Oil Pine, finds many applications in Varnishing, not only as a vehicle, but also as a lighter color dryer and hard surfacer.

JAPAN CROSS

[illegible] JAIL.



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[illegible] UP [illegible] JAIL.

PART No. XI.

(See Index on the next page.)

SUBJECT TREATED.

COMPLETE FORMULARY AND INSTRUCTIONS FOR MANUFACTURING

ALL SORTS OF

R O S I N P R E P A R A T I O N S.

Part No. II.

SECRET FORMULARY AND INSTRUCTIONS FOR MANUFACTURING
ALL SORTS OF
ROSIN PREPARATIONS.

-:-:-:-:-:-:-

About the manufacture of ROSIN PREPARATION not separating granulating or settling in oil or benzine, from the use of FRENCH ARTIFICIAL KAURI - - - - - - - - 1100

Manufacture of ROSIN GLOSS PAINT OIL, not granulating, hardening or separating, for use in Mixed Paints - 1110

Factory stock in tank of NEUTRALISED, HARDENED and PREPARED ROSIN VARNISH, also called "FRENCH ARTIFICIAL KAURI PREPARATION", for mixing Copal mixing Shellac, mixing Damar, and cheapening all sorts of Varnishes made from Hard Gums soluble in oil, turpentine or naphtha - - - - - - 1120

[illegible] OF LEAD and ZINC PAINT SPECIAL PREPARATION for making floor paints, cement paints, Hard Coatings - - - - - - - - - - - - - - - - - - - 1130

#193.

MANUFACTURE OF LOCKE GLOSS PAINT OIL

NOT SEPARATING, GRANULATING OR GELATING IN OIL OR BENZINE.

-:-:-:-:-:-:-:-

Resin only melted and thinned down with benzine without having been previously neutralized, produces a varnish, or better said, a lacquer or varnish which, as it is turned, does not keep. The resin either settles, separates from the benzine or granulates after a certain length of time; and the preparation thus made becomes unfit for use.

Such preparations especially intended for Paint manufacturer's use, are very often the cause of endless drawbacks deriving generally from the acidity of the resin.

A considerable quantity of Rosin-Benzine preparations, commercially termed "GLOSS OIL" or "GLOSS PAINT" is used every day in the manufacture of special grades of Mixed Paints. This preparation is sold at a price ranging from twelve to seventeen cts. per gallon. It is intended to be mixed with Linseed Oil Paints containing White Lead, Zinc or other pigments or Lime, capable of a chemical reaction, and therefore it is a matter of great importance for the Paint Manufacturer to use a "GLOSS OIL" or "GLOSS PAINT" made from resin perfectly neutralized and especially prepared with a thorough understanding of the peculiar

action and characteristics of rosin mixed with Linseed Oil, White Lead and White Zinc.

A practical varnish maker knows well enough that in order to produce a good "ROSIN PREPARATION" which will no granulate ("GO BACK") after being been thinned down with Benzine, it is necessary to completely neutralize the melted rosin with some chemical agents before the operation of thinning down.

No matter for what purpose the rosin preparation is intended, the rosin must always be neutralized and the neutralization made from chemicals capable of improving in the meantime the maximum amount of hardness.

In the manufacture of certain varnishes and especially in cases where the question of changing is an imperative one, the use exclusively of expensive gums such as Zanzibar, Sierra Leone, North Coast, Benguela or Kauri, becomes impossible. Rosin preparations are then resorted to, either unmixed as it is the case in the lower grades of "FURNITURE VARNISHES", or mixed with superior gums for FURNITURE GRADE VARNISHES, such as NO. III FURNITURE, NO. II COPAL, WHITE ICEBERG BRILLIANT GOLD, WHITE GOLD, etc.

In the preparation of special grades of "FIRE PROOFS", the addition of Rosin Loss Point Oil is not always made with a view of reducing the cost, but in order to produce certain results not obtainable from Linseed Oil.

(111).

R O S I N G L O S S P A I N T O I L.

Not granulating, hardening or separating, for use in Inoc. Paints.

-:-:-:-:-:-:-:-:-

F O R M U L A :

Yield in gallons:

20 - - - 200 lbs. - - - - - - Rosin K.

6 gals. - - - - - Water.

4 ozs. - - - - - Glycerine (crude)

6 lbs. - - - - - Caustic Soda.

3 lbs. - - - - - Sugar of Lead.

3 " - - - - - Hydro Calcine.

1 " - - - - - Ground Glass.

Follow the instructions as per method and process given in INSTRUCTIONS OF MANUFACTURE, chapter 4; but instead of allowing the MANUFACTURE OIL or Lead Board Oil to cool and solidify after the first operation, it is to be thinned down first with No. IX DILUENT OF LEAD OIL in the proportion of only 3 gals., and then thinned down with 40 deg. DEODORIZED NAPHTHA in the proportion of 40 gals. The above formula should then be completed thus:

5 - - - - - - 3 gals. - - - - No. IX Cloute of Lead Oil.

40 - - - - - - 40 " - - - - Deodorized Naphtha.

#1120.

FACTORY STOCK OF NEUTRALIZED, HARDENED AND PREPARED ROSIN VARNISH

also called

FRENCH ARTIFICIAL KAURI PREPARATION.

for mixing Copal, mixing Shellac, mixing Damar, and cheapening all sorts of Varnishes made from Hard Gums soluble in oil, turpentine or Naphtha.

-:-:-:-:-:-:-:-

F O R M U L A :

Yield in gallons:

20 - - - -	200 lbs. - - - - -	Rosin F.
	6 gals. - - - -	Water.
	4 ozs. - - - - -	Glycerine (crude)
	5 lbs. - - - - -	Caustic Soda.
	8 " - - - - -	Sugar of Lead
	5 " - - - - -	-Hydro Calcine
	1 " - - - - -	-Ground Glass.
40 - - - -	40 gals. - - - -	Camphorated Naphtha.

In this formula as it can be noticed, there is no prepared oil used; and the resulting compound is a Varnish preparation in which the rosin, from a very poor ingredient, has become a valuable factor in Varnish making through the above treatment.

1130.

R E S I N A T E O F L I M E A N D G L Y C E R I N E .

special preparation

FOR MAKING FLOOR PAINTS - - CEMENT PAINTS - - HARD COATINGS, ETC.

-:-:-:-:-:-:-

F O R M U L A :

Yield in gallons:

30	300 lbs.	Rosin A.
	6 gals.	Water.
	4 ozs.	Glycerine (crude)
	6 lbs.	Caustic Soda.
	6 "	Sugar of Lead.
	5 "	Hydro Calcine.
	1 "	Ground Glass.
40	40 gals.	Deodorized Benzine.

After this preparation has been allowed to cool, it is to be mixed in the proportion of 75% in volume with 25% of an ordinary Kauri Varnish. The mixture is to be made cold and allowed to settle in tank until perfectly clarified before using it.

Many specialties are made in the Paint line from White Zinc or Lead, previously ground in oil and thinned down with this.

PART No. XII.

(See Index on the next page.)

SUBJECT TREATED.

COMPLETE FORMULARY AND INSTRUCTIONS FOR MANUFACTURING

ALL SORTS OF

L I Q U I D D R I E R S.

Part No. XII.

COMPLETE FORMULARY AND INSTRUCTIONS FOR MANUFACTURING

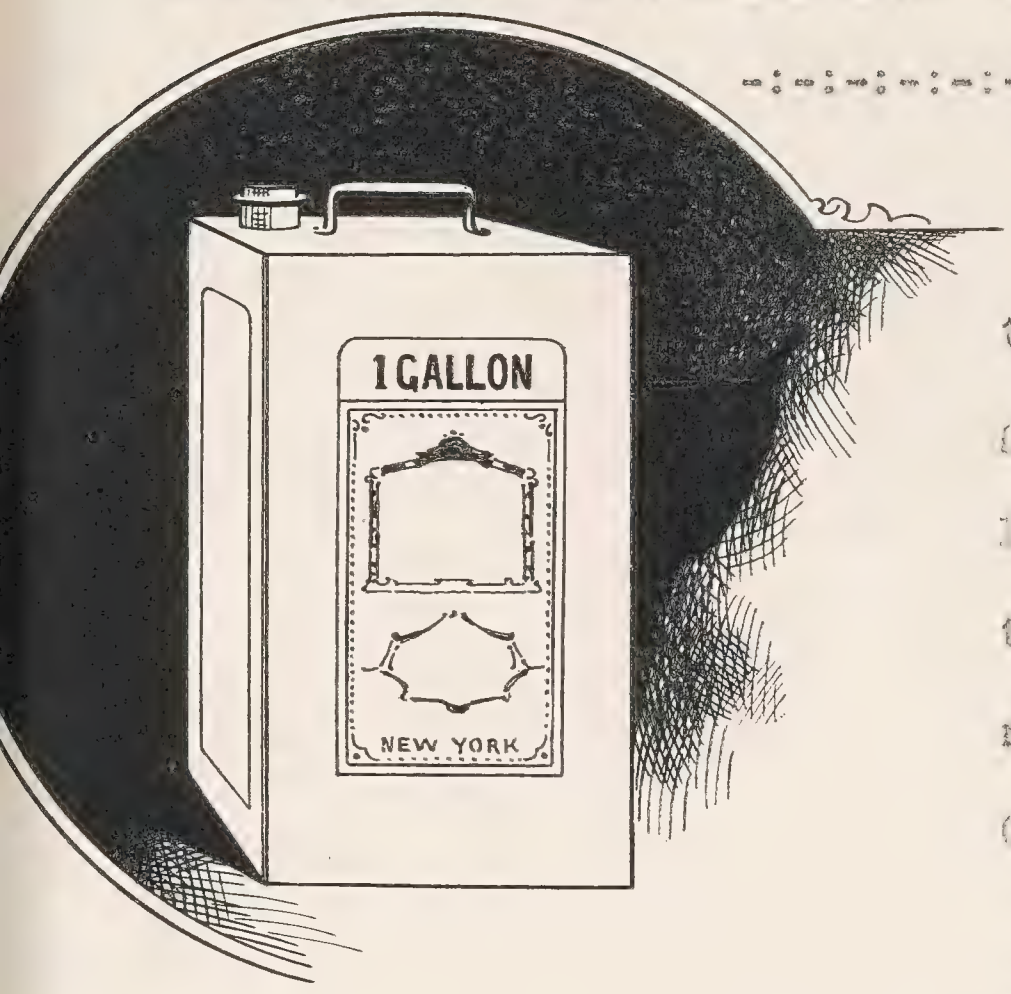
all sorts of

L I Q U I D D R I E R S.

-:-:-:-:-:-:-

G E N U I N E E N G L I S H T E R E B I N E D R I E R.

-:-:-:-:-:-:-:-:-:-



Into a 200 gallon iron kettle, mounted on truck, put 50 gallons of Bleached or REFINED LINSEED OIL, same as obtained by the Sulphuric Acid Process, already described in the SCIENCE OF VARNISH MAKING.

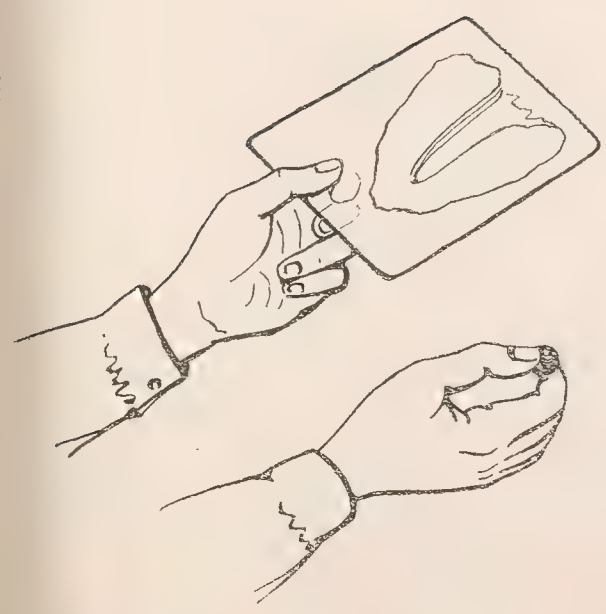
Carry your kettle over an incandescent fire of coke and heat your linseed oil up to 575 deg. Fah.; then allow it to cool until the thermometer indicates 375 deg. Fah.; at this moment add gradually and under constant stirring, 50 lbs. of LITHARGE CRYSTALS, using a metallic sieve so as to distribute the Litharge over the surface of the Oil, and keep stirring constantly until/all the Litharge has been taken up by the Oil. If too much froth is produced, remove kettle from fire until all the froth is subdued; then carry over the fire again and repeat the same operation with 50 lbs. more of RED LEAD; as soon as the Red Lead has been taken up, add 25 lbs of perfectly dry RAW TURKEY UMBER previously crushed.

Raise the temperature now up to 575 deg. Fah., and when all

the chemicals and oxidizing agents have been absorbed, cook the mixture for about half an hour at a temperature of 405 deg. F. The harder it is boiled, the quicker it will dry.

Watch the temperature that the thermometer indicates, and do not allow it to go higher than 505 deg. F. until all the chemicals and oxidizing agents have been thoroughly taken up and the liquid is free from froth on the surface and has turned a brown color.

Take samples from time to time, using the iron stirrer and allowing the material to run, drop by drop, on a piece of tin or glass. By this time, the preparation should be oxidized enough to solidify. If it does not solidify when it comes in contact with the cold surface of the window glass, it is to be cooked a little longer.



When the sample solidifies and can be rolled up into firm pills, the liquid has boiled enough. The Turpline Drier is then ready. It should be removed from the fire place and allowed to cool to 400 deg. F.

What is to be done now is to take the kettle and contents out of the melting room to the thinning room, where the last operation will take place.

Put the cover on the kettle so as avoid a partial solidifying in case the temperature outside of the melting room should be too low, especially in winter.

The best arrangement for thinning a Terebine Drier, is illustrated by this cut.

According to the price at which the Drier is to be sold, it should be thinned down either with Turpentine, Naphtha or with both, in a proportion regulated by the price.

The proportion of thinner or diluent required for the above formula, is 135 gallons.

The resulting product is a strong oxidizing compound, which can be used either in Paints or in Varnishes.

O I L B O I L E R S C O N C E N T R A T E D D R I E R.

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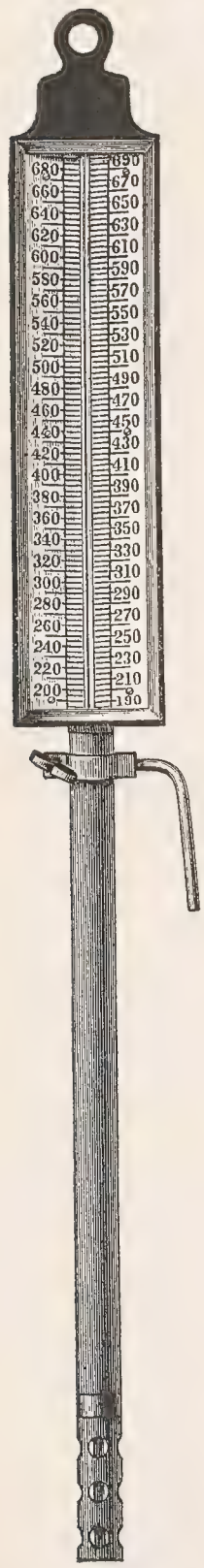
This liquid drier is intended to be used for mixing cold with Raw Linseed Oil, so as to increase the drying property of the Oil as much as desired.



An addition of five ounces of this drier to every one hundred ounces of Raw Linseed Oil gives as a result an oil drying in fourteen hours. If three gallons are used instead of five per hundred, the result is an Oil drying in twenty hours.

This drier dries so readily with Linseed Oil that it can be added in the proportion of one gallon to a barrel containing 40 gallons of Raw Linseed Oil, thus making 41 gals. of Oil are added to the concentrated drier contained in the four bottle boiled Linseed Oil. The color thus made is usually as good as the drier, and the Oil can be used for the same purposes as the [illegible] boiled Oil.

It cannot be used alone or like other driers. This drier should not be used with Turpentine, for the reason that being used with a small quantity of Oil, its drying power is fully developed only when it comes in contact with Raw Linseed Oil.

#1220.

O I L B O I L E R S C O N C E N T R A T E D D R I E R.

-:-:-:-:-:-:-:-

Yield in gallons:

35 - - - - 35 gals. - - - - - - Calcutta Linseed Oil.

15 - - - -150 lbs. - - - - - - Rosin H.

75 " - - - - - - Muriatic Acid 22 deg.

35 " - - - - - - Granulated Manganese.

20 " - - - - - - Oleate of Lead.

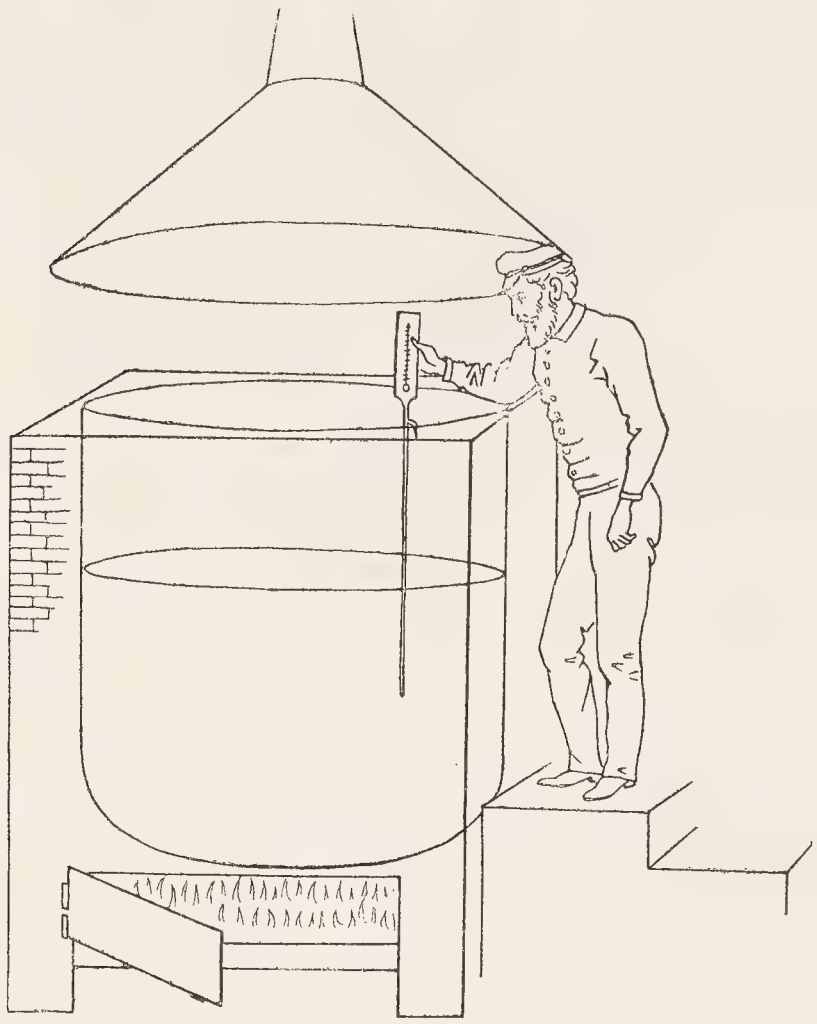
100 - - - 100 gals. Turpentine or Naphtha.
100 gals.

INSTRUCTIONS:

Melt the rosin; add gradually the oil to it, and when intimately incorporated at a temperature of 400 deg. F., add under constant stirring the Oleate of Lead.

In a separate vessel saturate the 35 lbs. of Granulated Manganese with the 75 lbs. of Muriatic Acid; then carry this mixture gradually over the kettle; heat up to 550 deg. F., and when all the chemicals are taken up, thin down with Turpentine or Naphtha in the proportion indicated by the formula.

KETTLE BOILED LINSEED OIL made in a large stationary kettle by the ordinary method, is a long and tedious operation.



By the use of only 1 gal. of OIL BOILERS CONCENTRATED DRIER, made as per formula and process given in the previous page a barrel containing 40 gals. of Raw Linseed Oil can be rendered

similar to KETTLE BOILED LINSEED OIL as to color and drying.

#1230.

E N G L I S H P A T E N T P A I N T D R I E R.

-:-:-:-:-:-:-

First make two solutions in water separately:

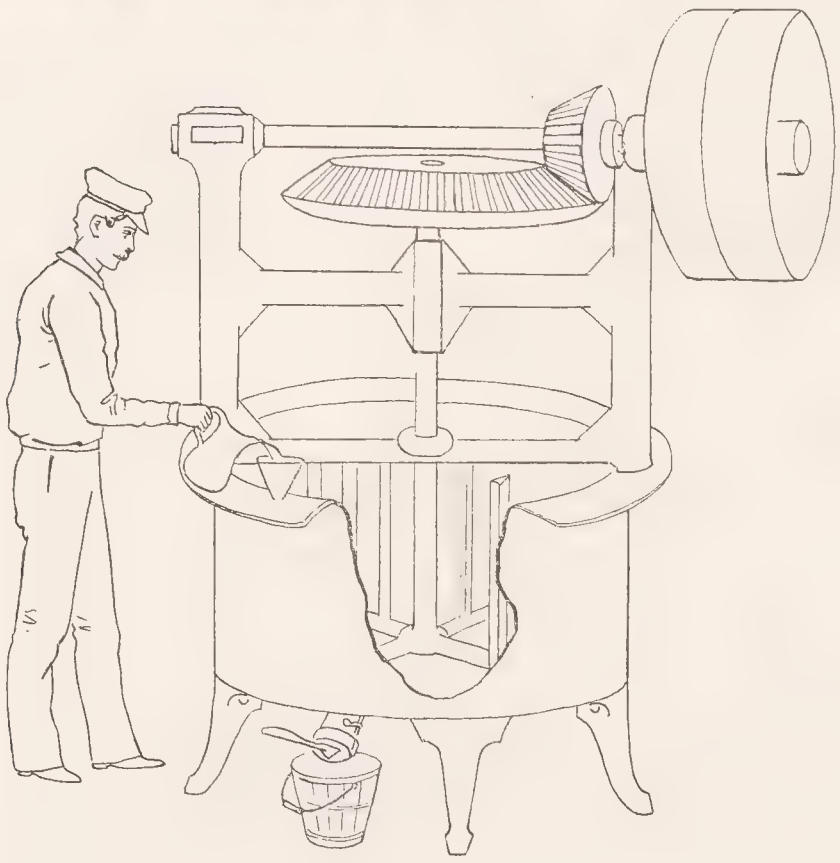
A saturated solution of Acetate of Lime - - - - - - - - - 1 gal.

A saturated solution of Sulphate of Manganese - - 1 "

Mix together and stir well. The following reaction takes place:

$$n\,SO_4\,Ca\,(C_2H_3O_2)_2\,Mn\,(C_2H_3O_2)_2\,Ca\,SO_4.$$

PUT IN MIXER:



110 lbs. of PARIS WHITE; and after the mixer is in motion, add gradually the water solution of chemicals named above and which has resulted in ACETATE OF MANGANESE and SULPHATE OF LIME. This will form a thick mixture to which you must gradually incorporate 60 lbs. of WHITE LEAD dry and 100 lbs. of OXIDE OF ZINC.

Should the mixture be too stiff, add to it a very little water so as to get a perfectly homogeneous paste.

This paste is to be incorporated with 4 gals. of LINSEED OIL, and then ground thro gh a Burr-Stone mill to the consistency of a Paste Paint. It is then put up in cans and sold under the name of "PATENT PASTE DRIER".

E X T R A P A L E D R I E R F O R W H I T E P A I N T S.

-:-:-:-:-:-:-:-:-:-

A perfectly white drier, remaining colorless when exposed to the action of the air, has not yet been found. Paint manufacturers are especially interested in an article of this kind which could be added to White Lead or White Zinc without spoiling the intensity of the white or turning it yellow.

There are some Turpentine Driers, very light in color after being freshly made from such chemicals as:

MANGANESE OLEATE,

LEAD OLEATE;

but these driers have not a great deal of strength or power as oxidizing agents, and furthermore, they turn yellowish when exposed to the action of air.

An extra Pale Drier for White Paints can be obtained by simply mixing in a barrel, as the one above, or in a larger vessel if large quantities are to be made, 5 gallons of GOLD SIZE JAPAN with 10 gallons of WATER WHITE HARDENED ROSIN PREPARATION. (See these formulas). Thin down with 20 gallons of Naphtha.

#1250.

E L E C T R I C D R I E R.

-:-:-:-:-:-:-:-

Yield in gallons:

30 - - - - 30 gals. - - - - Raw Linseed Oil.

15 - - - -100 lbs. - - - - Resin.

60 " - - - - Granulated Manganese.

7 " - - - - Finely Powdered Borax.

20 " - - - - Manganese Oleate.

10 " - - - - Lead Oleate.

35 - - - - 35 gals. - - - - Turpentine.

70 - - - - 70 " - - - - Benzine.

150 gals.

INSTRUCTIONS:

Melt the rosin, incorporate the oil intimately with it, and add at a temperature of 300 deg. F., first the MANGANESE OLEATE, mixing thoroughly until it is all taken up; then do the same with the LEAD OLEATE. When the two Oleates have been taken up by the oil and the rosin, add gradually the powdered borax; let the preparation simmer gently for 25 minutes, being careful not to overheat, and subdue the froth when produced.

The next thing add your GRANULATED MANGANESE; heat up slowly, taking the necessary precautions as per instructions previously given. Do not heat above 540 deg. F. Cool down and thin.

PART No. IIII.

(See Index on the next page.)

SUBJECT TREATED.

COMPLETE FORMULARY AND INSTRUCTIONS FOR MANUFACTURING

ALL SORTS OF

LACQUERS AND VARNISH STAINS.

Part No. VIII.

COMPLETE FORMULAE [illegible] OF [illegible]

all sorts of

L A C Q U E R S A N D V A R N I S H S T A I N S .

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L A C Q U E R S A N D V A R N I S H S T A I N S.

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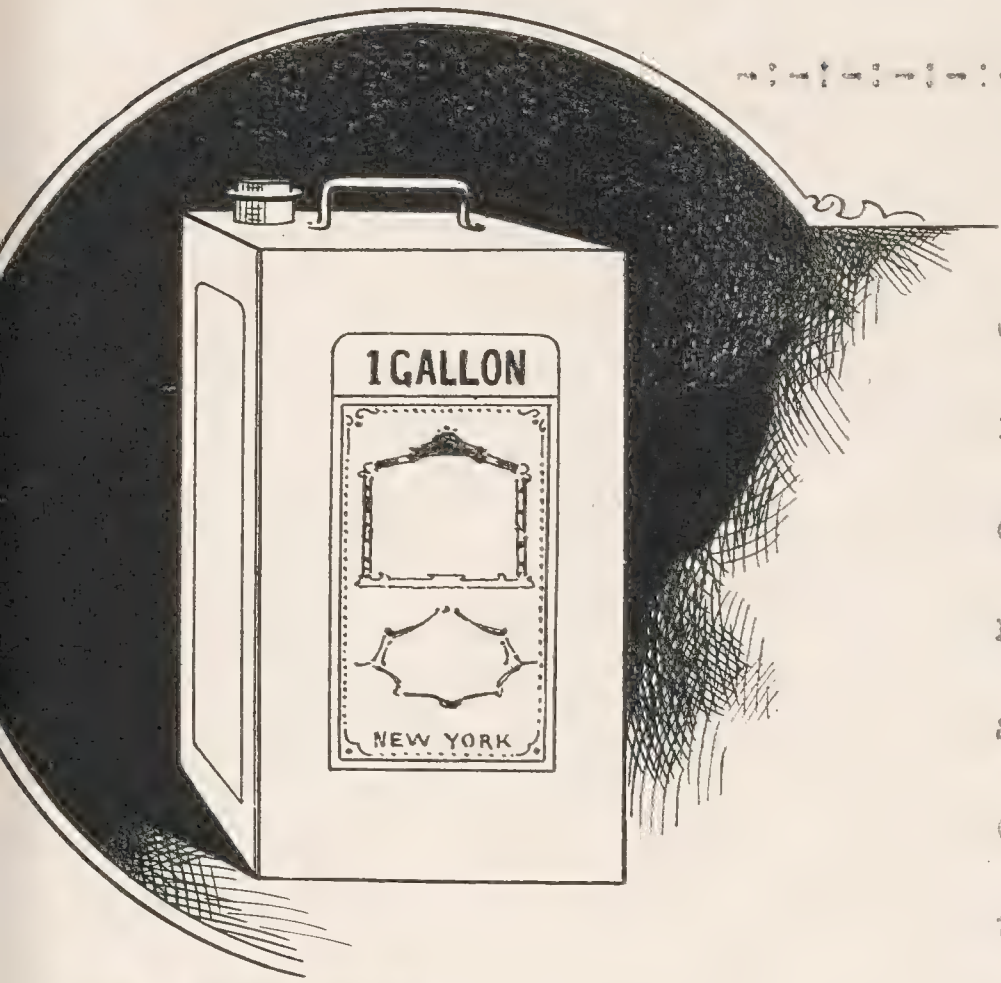

The practical manufacture of Lacquers and Varnish Stains is simply mechanical and no chemical knowledge is required; neither is it necessary to have a considerable experience in questions of temperature, as is the case in the manufacture of Fat Varnishes.

Lacquers are either colorless or colored artificially to any tint desired. In both cases, a Lacquer is a transparent coating or Varnish composition which, after being applied on a wood surface, permits seeing the veins or the grain of the wood, contrary to a Paint which is opaque. A Varnish Stain is nothing but a colored Lacquer.

Making Lacquers or Varnish Stains practically consists in tinting a LIQUID BASE or VARNISH with a coloring substance, soluble in the BASE or VARNISH without affecting its transparency.

Consequently, if we have in stock, ready made preparations or LACQUER BASES, and suitable coloring preparations for tinting, we will be able to produce all sorts of Lacquers and Varnish Stains.

F A C T O R Y S T O C K O F L A C Q U E R B A S E S

or Colorless, Transparent and Glossy Preparations

FROM WHICH ALL SORTS OF COLORLESS LACQUERS CAN BE MADE.

-:-:-:-:-:-:-:-:-

I will first indicate the various MODUS OPERANDI for the preparation of LACQUER BASES, the Lacquer Base being understood as COLORLESS LACQUERS. These Colorless Lacquers must be prepared especially according to the purpose for which they are intended; as to the COLORED LACQUERS, we will obtain them by simply coloring the BASES with a COLORING EXTRACT or a TINCTURE, the preparation of which will be given further on.

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1310. "C O L O R L E S S L A C Q U E R", No. 1.

FORMULA:

Acetone	5 gals.
Wood Alcohol	5 gals.
Manila Dust	60 lbs.
Camphor Gum.....	1 lb.
W. W. Rosin	3 lbs.

Allow to settle and clarify and keep in stock for use as it is or for making from it Alcohol Lacquers of various colors/

1320

C O L O R L E S S L A C Q U E R? No. 2.

If a more elastic but not so hard a colorless lacquer is wanted, then the following formula is to be used:

FORMULA.

Methylated Spirit	9 gals.
Refined Fusel Oil	1 gal.
Castor Oil	2 ozs.
W. W. Rosin	5 lbs.
Manila Dust	60 lbs.

Allow to settle and clarify and keep in stock for use as it is, or for making from it Alcohol Lacquers of various colors.

-:-:-:-:-:-:-:-:-:-:-

1330

C O L O R L E S S L A C Q U E R, No. 3.

Grain Alcohol	10 gals.
Manila Dust	40 lbs.
French Artificial Kauri, W. W. ..	20 lbs.
White Camphor Gum	1 lb.

Allow to settle and clarify and keep it in stock for use as it is, or for making from it Alcohol Lacquers of various colors.

1340.

C O L O R L E S S A L C O H O L L A C Q U E R, N O. 4.

FORMULA:

Wood Alcohol	3 gals.
Grain Alcohol	7 gals.
Granulated Bleached Shellac..	60 lbs.
French Artificial Kauri, A.A.	5 lbs.
Camphor Gum	2 ozs.

This formula gives a very fine Lacquer, exceedingly hard and adhesive to either a wood or a metallic surface.

-:-:-:-:-:-:-:-:-

1350

C O L O R L E S S A L C O H O L L A C Q U E R, No. 5.

Grain Alcohol	10 gals.
Granulated White Shellac....	55 lbs.
Camphor Gum	1 oz.

The most expensive French Lacquers are made from this base, colored wiht vegetable or mineral coloring substances.

Before using this preparation alone and made as per above formula, or tinted in any color, it should be kept at least two weeks undisturbed, and longer if necessary, until all the ingredients are perfectly combined.

D I P P I N G G O L D L A C Q U E R F O R T I N C A N S.

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This Lacquer requires no apparatus or special organization to be made in quantities; it never cracks or peels; dries quickly and hard on tins, and leaves a beautiful yellow color absolutely unfading, and which can be varied from the highest to the deepest shade.

All that is required for making this lacquer, is a simple arrangement as per cut. This process is based upon the following principle.

WHEN AN ASPHALTUM JAPAN IS THINNED DOWN WITH TEN TIMES ITS VOLUME OF TURPENTINE OR NAPHTHA, THE RESULTING PRODUCT BECOMES A VARNISH STAIN, PRODUCING ON WHITE METAL, ESPECIALLY ON TIN, THE COLORATION OF GOLD.

This being said there is but very little to add in the way of instructions for conducting the process. The Asphaltum Japan contains enough Oil to render the Lacquer HARD and ADHESIVE. As to the color, it is perfectly fast or permanent.

#1360.

S T A M P I N G G O L D L A C Q U E R F O R T I N C A N S

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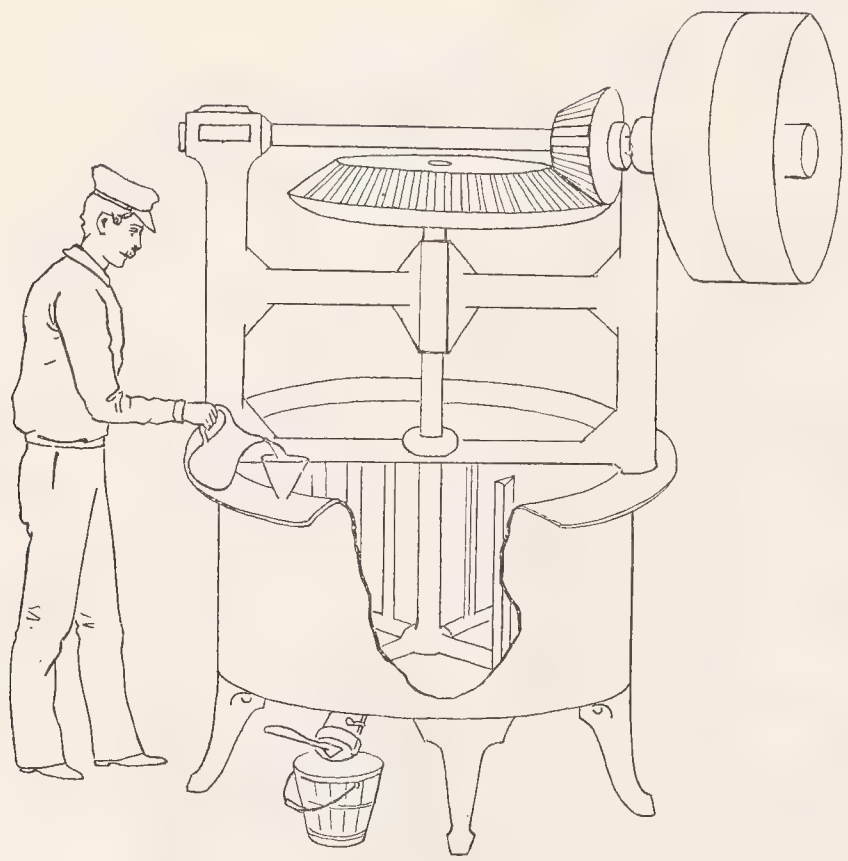
When a lacquer has been made from a soft gum or resin and applied on metal, it may work satisfactorily as a lacquer but not resist the stamping process. Special lacquers have to be made exceedingly hard for this purpose. Follow the instructions given in the previous formula. Use a mixer such as the one here be low.



Instead of usinf Asphaltum Baking Japan, as in the previous formula, use nothing but a PURE OIL DARK BROWN JAPAN, and thin down with five times its volume of Turpentine or Naphtha. The result will be a gold lacquer very adhesive on tin, drying very hard, not softening, and resisting the strongest pressure of a stamping machine.

1370

C H I N E S E G O L D L A C Q U E R.

Imitation.

-:-:-:-:-:-:-:-

FORMULA:

Colorless Lacquer, No. 1 ...	10 gals.
Wood Alcohol	1 gal.
Aurine	4 ozs.
Soluble Aniline Light Yellow	2 ozs.

Put in a suitable vessel, first, your 10 gals. of COLORLESS LACQUER, No. 1, and dissolve separately in a pail the 4 ozs. of AURINE in your 1 gal. of WOOD ALCOHOL; when this has been done, dissolve the SPIRIT ANILINE YELLOW, and then carry the whole contents of the pail into the recipient containing the COLORLESS LACQUER. Mix thoroughly, under constant stirring, for about five minutes and the Lacquer is ready to be put up in cans.

The AURINE, having a great colorific power, should be selected amongst the dye stuffs of this denomination, sold under the name of "Light Yellow Shade". AURINE, being sold in different colors, from Light Gold to Deep Orange, it is only the lightest shade that could give the desired result in combination with the SOLUBLE ANILINE LIGHT YELLOW, which will render the color much lighter yet.

1371.

FACTORY COLORING COMPOUNDS STOCK.

Coloring Extracts or Concentrated Tinctures,
from which all sorts of Oils, Vehicles,
Solvents, Spirits, Diluents
and Thinners can
be tinted or colored for producing
LACQUERS or VARNISH STAINS.

-:-:-:-:-:-:-:-

In Chapter XVI of "THE SCIENCE OF VARNISH MAKING" has been given a complete description of all the coloring substances soluble in oil, Benzine, Turpentine or Alcohol. In their solid state, these substances cannot be used directly for the production of a VARNISH STAIN or of a COLORED LACQUER. A concentrated solution must first be made in the very same solvent that is to be used as a vehicle in the LACQUER or the VARNISH STAIN. This is the coloring substance. In order to make a concentrated tincture, use less coloring than the amount required for a saturated solution, so as to avoid crystalizing, or settling, owing to changes of temperature

A concentrated tincture must be allowed to settle until perfectly clarified. After the varnish maker has prepared and clarified all the concentrated tinctures, it is then simply a question of adding more or less of this coloring solution to a COLORLESS BASE for producing either a COLORED LACQUER or a VARNISH STAIN.

#1372

FACTORY STOCK OF LINSEED OIL CONCENTRATED TINCTURES.

from which Oil Stains, Oil Colored Lacquers and Varnish Stains are

T I N T E D .

-:-:-:-:-:-:-:-:-

Use a steam jacketed kettle; fill it only two-thirds with the vehicle or solvent in which the tincture is to be made; turn the steam on and add gradually the coloring substance, under constant stirring, so as to help the solution. Should more coloring have been used than was necessary, the excess of it will remain undissolved, settling at the bottom; in which case add more solvent until all the residue has been "taken up". By taking note of the amount required, the Varnish maker can produce a tincture of a standard strength or normal colorific power in GREEN, MAROON, ORANGE, VIOLET, BLACK and YELLOW color,

using simply the coloring substances soluble in Linseed Oil and described in "THE SCIENCE OF VARNISH MAKING", Part No. XVI.

#1373.

FACTORY STOCK OF TAR OIL CONCENTRATED TINCTURES.

Aniline colors of every description, no matter whether they are soluble in alcohol, in oil or in water, are products deriving from coal tar and always soluble in coal tar oil, or in what is commercially termed "DEAD OIL". Consequently, if we heat in a steam jacketed kettle either tar oil or dead oil, it will be possible to dissolve any coloring substance of aniline dye deriving from coal tar and thus obtain concentrated tinctures of aniline colors in Oil of almost any shade, tint or tone that may be desirable.

What is called "CREOSOTE SHINGLE STAINS", so extensively used as a wood preservative and at the same time for coloring the same, are made from the ingredients and as per instructions above referred to.

"CREOSOTE SHINGLE STAINS" made in that way are not absolutely permanent; but if they fade through exposure, it is also the case when almost any pigment is applied instead of a stain.

#1374.

FACTORY STOCK OF SPIRIT CONCENTRATED TINCTURES

from which Alcohol Colored Lacquers and Alcohol Varnish Stains are

T I N T E D.

-:-:-:-:-:-:-:-

Owing to the high price of Grain Alcohol or Wood Alcohol, it is necessary to avoid the evaporation which would take place in boiling in a steam jacketed kettle. For this reason, the alcoholic tinctures should be made cold, and in order to help the

dissolving action of the spirit used, the apparatus is kept constantly revolving. Red, Blue Green, Yellow Brown, Orange, Black concentrated alcoholic tinctures are thus produced from the use of the coloring substances described in the "SCIENCE OF VARNISH MAKING", Chapter XVI, under the name of "SOLUBLE SPIRIT COLORS".

ORANGE SHELLAC ARTIFICIAL COLORING,

for producing a Rosol Oil or an Alcoholic Orange Tincture which can be used for imparting the positive color of Orange Shellac to a solution of Vanilla Gum in either Grain or Wood Alcohol.

-:-:-:-:-:-:-:-

[illegible] Gallon Petroleum Barrel, provided with a wooden faucet [illegible] and bucket from the bottom, put:

20 gals. of WOOD ALCOHOL

10 gals. of ALLIED ROSEL OIL

5 gals. of [illegible]

The above mixture or liquid ingredients gives 35 gals. of a solvent or compounded spirit in which

10 lbs. of AURINE

was dissolved under constant stirring; [illegible] is complete, it is allowed to settle and [illegible]. This compound Alcohol Tincture, aside [illegible] specified, finds application for tinting COLOR-[illegible].

LATEST OIL AND VARNISH WOOD STAINS

FOR APPLYING ON HARD OR SOFT WOOD.

Part No. XIV.

COMPLETE FORMULARY AND INSTRUCTIONS FOR MANUFACTURING

ALL SORTS OF

WHITE AND ORANGE SHELLAC VARNISHES.

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S H E L L A C V A R N I S H E S .

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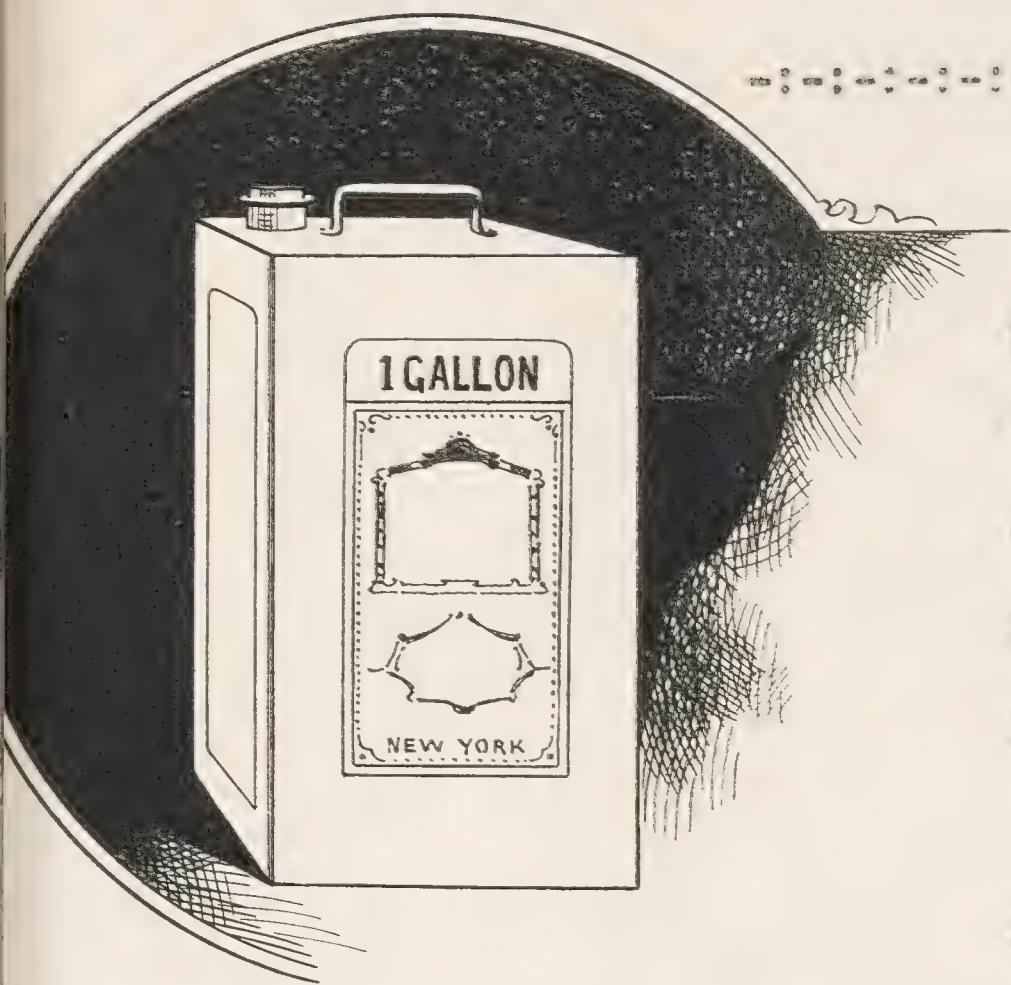


Shellac Varnishes are today placed on the market at a price which renders impossible the use of standard ingredients, such as PURE GRAIN ALCOHOL and PURE GLACIAL SHELLAC.

The manufacture of PURE SHELLAC VARNISHES would be unconditionally simple, if it were only a question of dissolving either ORANGE or the BLEACHED SHELLAC in either Grain or Wood Alcohol at 97 deg. proof. But the question of cost is, in the majority of cases, the first consideration of the buyer; and the manufacturer has therefore to use ingredients of inferior quality and to compound them with a great deal of care and skill.

THE COMPONENT INGREDIENTS OF A SHELLAC VARNISH ARE:

1st. The use of a Solvent cheaper than Alcohol.

2nd. The use of a Resin cheaper than Shellac.

3rd. A fictitious degree of thickness.

4th. A filler giving more body.

These questions will be treated at length, separately.

DISSOLVING POWER OF WHITE SHELLAC.

-:-:-:-:-:-:-:-:-

CAUSES WHICH CONTRIBUTE TO INCREASE OR DECREASE THE DISSOLVING POWER OF SHELLAC IN ALCOHOL.

Orange Shellac, as well as White Bleached Shellac, must dissolve in pure Alcohol (either wood or grain) without residue.

The quantity of Shellac which can be dissolved depends, first, on the degree of purity or freedom from water of the Alcohol or solvent used. It depends also on the mechanical process used for "cutting" the Shellac and the temperature at which the operation is conducted.

When Orange Shellac or shells are used for the production of Shellac Varnish, the results to be expected from Alcohol are uniform, providing that the Alcohol be always of the same degree of proof. But when White Bleached Shellac is used instead of Orange Shellac in the production of an Alcohol Varnish which must be colorless, the amount of Bleached Shellac that can be dissolved or "taken up" by the Alcohol, varies according to the process adopted in bleaching. Certain bleaching processes may give a very white bleached Shellac at an ordinary temperature.

It very often happens that WHITE BLEACHED SHELLAC shows a very pronounced acid reaction. This is due to an insufficient washing

of the PULP SHELLAC after its precipitation by Sulphuric Acid. A White Bleached Shellac, having an acid reaction is invariably very hard and difficult to dissolve in Alcohol. The addition, in one pint of boiling water, of Caustic Soda (2 ozs.) per every 10 gals. of Alcohol Shellac imperfectly dissolved, will neutralize the acidity and render the Shellac perfectly soluble.

ABSOLUTE REQUIREMENTS OF AN ALCOHOL INTENDED TO BE USED AS A SOLVENT FOR SHELLAC. DRAWBACKS RESULTING FROM WATER BEING PRESENT IN BLEACHED SHELLAC OR ALCOHOL.

It is a fact well known that ROSINS as well as GUM RESINS are precipitated from their solutions in Alcohol by the addition of water; the affinity of alcohol for water is such that if only a little water is added to a solution of Shellac Alcohol Varnish the water will combine with the Alcohol while part of the Shellac will at once precipitate or separate from the solution.

If, instead of adding water to the solution of Shellac in Alcohol, the water is present to a certain extent in the Alcohol used for "cutting" the Shellac, this will dissolve very slowly, and only a very small amount of it will be "taken up"; and the solution will always have a tendency to settle or form a residue.

For the above reasons, a good Shellac Varnish cannot be made from an Alcohol of less than 95 deg. proof, and this question is a capital one in making good Shellac Varnishes.

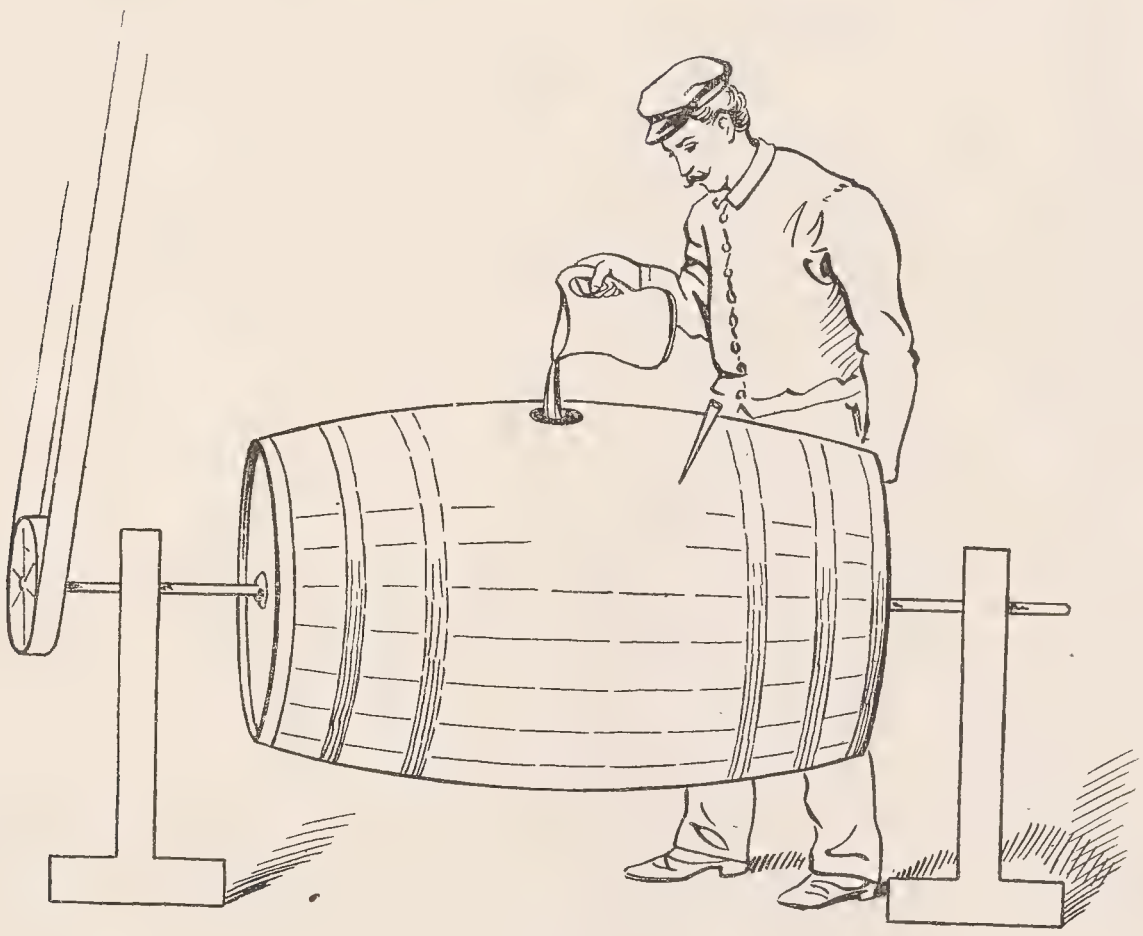
#1430.

M A K I N G S H E L L A C V A R N I S H E S

BY THE REVOLVING BARREL PROCESS.

-:-:-:-:-:-:-

About four-fifths of the shellac varnish manufactured in the United States is made by dissolving 5 lbs. of either WHITE or ORANGE SHELLAC in a barrel suspended as per cut, and revolving it at a speed of about 50 revolutions per minute. The result is a rather thin shellac varnish having a tendency to settle.



For making thin solutions of shellac in alcohol, this method may give satisfactory results; but when it is a question of producing a shellac varnish fully equal to the French and having a body as heavy as copal, the following process is then resorted to:

#1440.

M A K I N G S H E L L A C V A R N I S H E S

BY THE "CUTTING" MIXER PROCESS.

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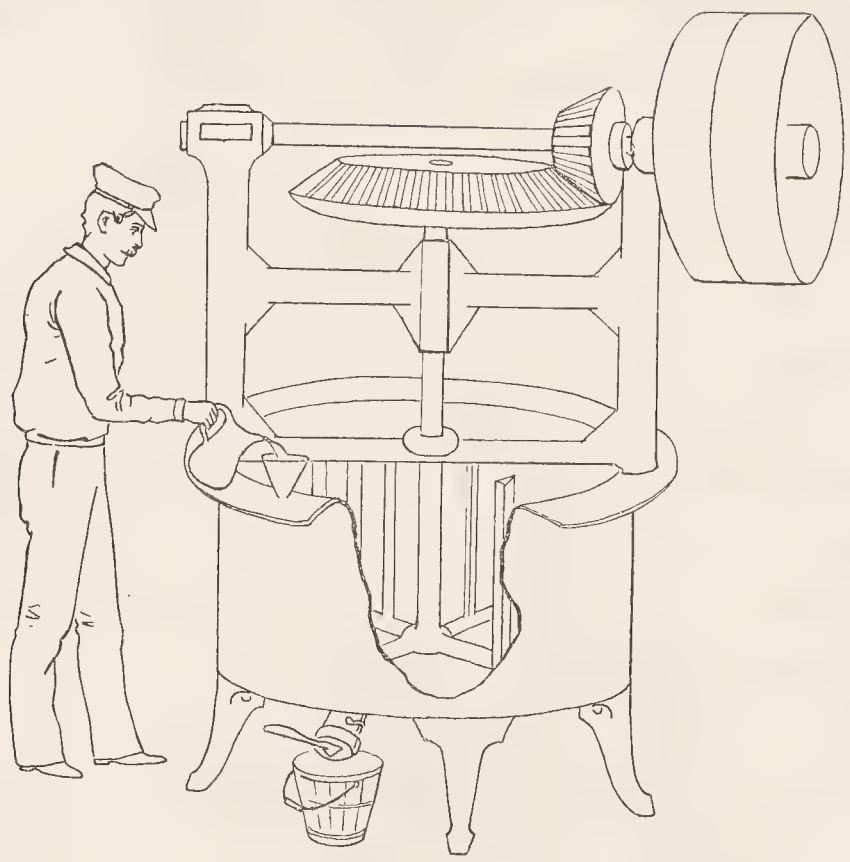
Bleached Shellac presents peculiarities similar to rubber and cannot be dissolved completely by simple immersion or heating, as is the case with Camphor, Manila or Rosin. There is only one way of making a very heavy Shellac Varnish showing no tendency to



settle, and this is by the use of a "Cutting" mixer, which first produces a softening of the shellac gum, then a mingling, afterwards a jelly, and finally a perfectly disintegrated paste having the consistency of gelatine. A thick jelly is made from 100 lbs. of Shellac in 8 gals. of Alcohol, then thinned down as desired.

#1450.

S H E L L A C S O L V E N T S

OF EVERY DESCRIPTION. TREATMENT, USES AND APPLICATIONS OF ALL SORTS OF SHELLAC SOLVENTS AND ALCOHOL SUBSTITUTES IN THE MANUFACTURE OF SHELLAC VARNISHES.

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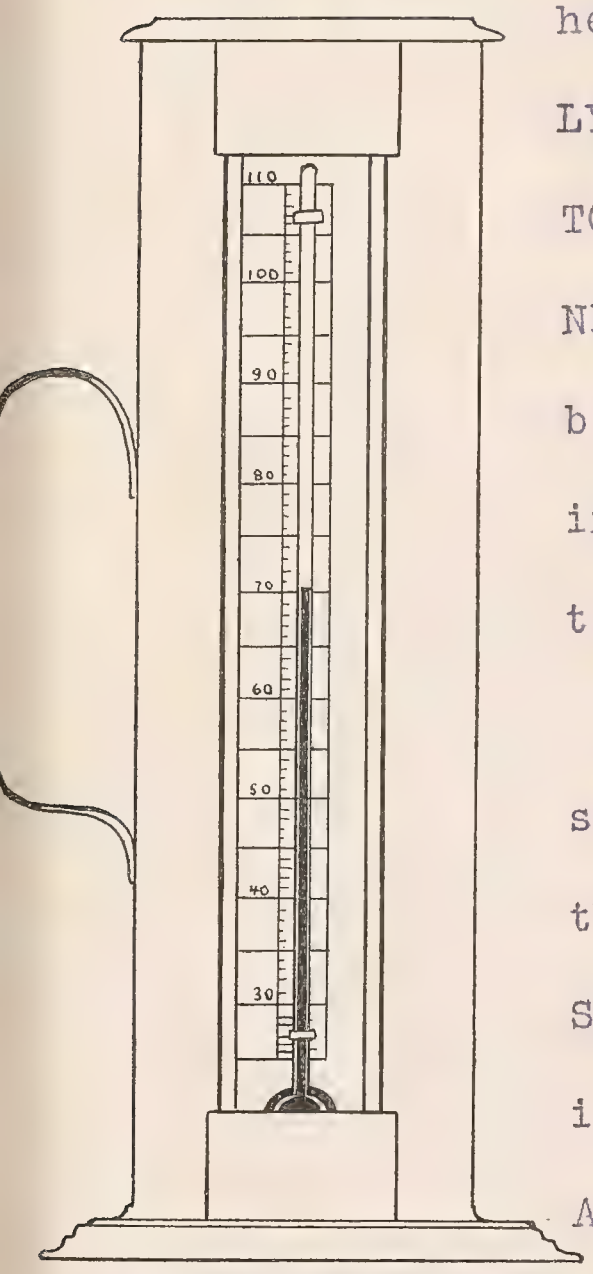
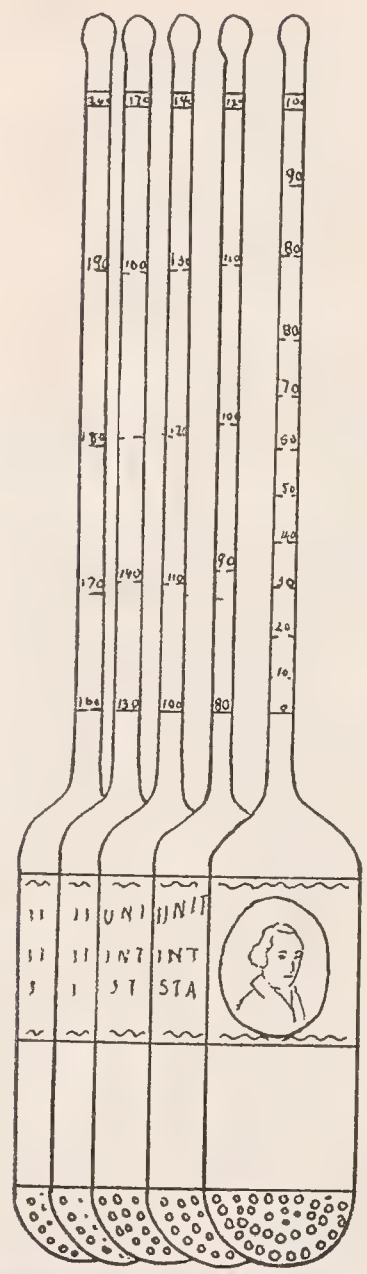
In Chapter XX of the "SCIENCE OF VARNISH MAKING" and under the heading of "HOW TO TEST PRACTICALLY GRAIN OR WOOD ALCOHOL INTENDED TO BE USED IN MAKING SHELLAC VARNISHES AND ALCOHOL LACQUERS", will be found full particulars concerning the simplest method of ascertaining the degree proof.



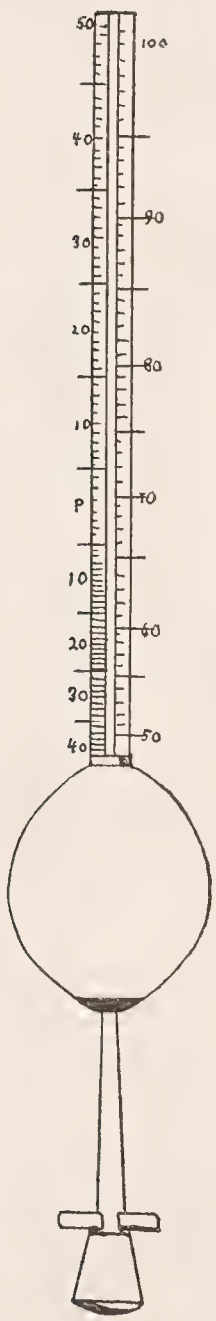


GRAIN ALCOHOL is the best solvent used in this country for the manufacture of White or Orange Shellac Varnishes; but owing to its high price, the use of Grain Alcohol is restricted to the production of FINE ALCOHOL VARNISHES, in which the quality rather than the price should be the first consideration.

The above cut represents the U. S. Standard Hydrometer for Alcohol.

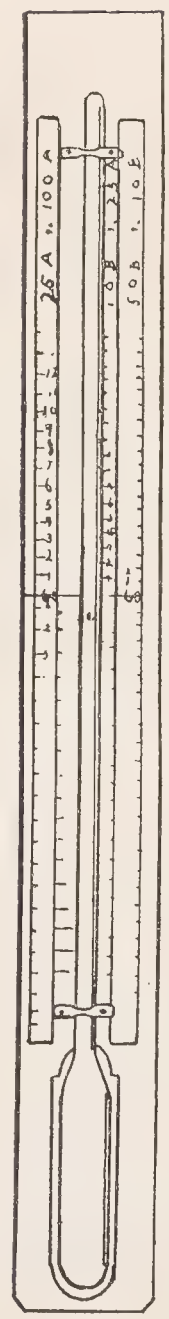
WOOD ALCOHOL or METHYLIC ALCOHOL is a product resulting from the distillation of wood, extensively used nowadays in place of grain Alcohol as a solvent for shellac in the manufacture of Alcohol Varnishes.

There are many different sorts of brands of Wood Alcohol; their quality as a solvent for shellac depends on their degree of purity. Wood Alcohol or Methylic Alcohol is miscible with water in all proportions but not with Fixed Oil.



As this product rarely occurs in commerce in a state even approaching that of purity, great care should be exercised in testing it as to freedom from water before using any in the preparation of Shellac Varbishes.

See the instructions given for testing the degree proof of Wood alcohol by the use of instruments as per cut in Chapter XX of the "SCIENCE OF VARNISH MAKING".



No Wood Alcohol should be used for cutting bleached shellac if it does not show in the test with the Hydrometer at least 95 deg. proof. As to the pungent smell this is the only objection.

ABOUT SHELLAC SOLVENTS CHEAPER THAN ALCOHOL.

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The question of Shellac Solvents CHEAPER THAN ALCOHOL has for years attracted the attention of varnish makers and chemists. I give hereafter, the results of my experiments in this direction, with quite a number of formulas for making solvents that can be associated with Alcohol or used alone in CUTTING SHELLAC.

ABOUT THE USE OF ACETONE IN CUTTING SHELLAC:

Acetone is another product of the destructive distillation of acid salts. It is miscible with water and alcohol in any proportions. It is named, also, PYROACETIC SPIRIT. The commercial Acetone is very impure; but providing that it contains no water, the presence of these impurities is not a bar to its use as a Shellac Solvent, or as an ingredient of Shellac solvents. Its smell is penetrating but can be rendered more agreeable by the addition of 1 gallon of grain alcohol in which 1/4 of an oz. of ESSENTIAL OIL OF COGNAC has been diluted, to every 25 gals. of Acetone.

The density of Acetone is 0.814; the boiling point, 132.8° F.

The addition of 1 gallon of Acetone to 25 gallons of Wood Alcohol, will produce a solvent that will cut Shellac more readily than Wood Alcohol alone.

ABOUT THE USE OF BENZOL IN CUTTING SHELLAC.

As a substitute for Alcohol in cutting Shellac, Benzol can also be used, either alone or associated with other ingredients, as will be seen in the formula which I give further on.

BENZOL is not miscible with water, but dissolves Oil and a great number of soft and hard Rosin Gums used in Varnish Making. Mixed with Fusel Oil, it gives a product having many of the characteristics of ALCOHOLIZED NAPHTHA. The mixture of Fusel Oil and Benzol should be made according to instructions given in the process for making ALCOHOLIZED NAPHTHA.

FUSEL OIL, ITS USE AS A SOLVENT FOR SHELLAC, TREATMENT AND APPLICATION. HOW TO REFINE CRUDE FUSEL OIL, DEODORIZE FUSEL OIL; ADVANTAGES AND DRAWBACKS DERIVING FROM THE USE OF FUSEL OIL.

Full particulars and instructions concerning the above will be found in the 6th Part, or Chapter VI, of "THE SCIENCE OF VARNISH MAKING", under the heading of "Questions of Deodorizing Vehicles and Solvents."

Refined Fusel Oil and ordinary Fusel Oil are used only in the preparation of economical Shellac Varnishes and Cheap Alcohol Lacquers. Fusel Oil is also used for the first treatment of Naphtha intended to be used with Alcohol.

1455.

ABOUT THE USE OF ALCOHOLIZED NAPHTHA IN REDUCING THE COST OF A SHELLAC SOLVENT.

As has been described in Chapter XVII on the subject of "Manufacturing all Sorts of Substitutes for Solvents and Diluents", and in Chapter XVI, of "THE SCIENCE OF VARNISH MAKING", Naphtha, 63 deg. can be rendered miscible with alcohol in the proportion of 23%.

Owing to its extremely low price compared to the price of Alcohol, Naphtha is a precious ingredient for use in the preparation of Shellac Varnish substitutes and economical Lacquers.

In the various formulas hereafter given, for making Shellac Solvents cheaper thanAlcohol, quite a number of applications will be made of Alcoholized Naphtha as one of the ingredients.

1456.

HOW TO NEUTRALIZE THE PUNGENT SMELL OF WOOD ALCOHOL, ALCOHOLIZED NAPHTHA, ACETONE AND FUSEL OIL.

HOW TO CONVERT THE GENUINE SMELL OF GRAIN ALCOHOL TO WOOD ALCOHOL AND ECONOMICAL SHELLAC SOLVENTS.

In Chapter VI of the "SCIENCE OF VARNISH MAKING" on "Questions of Deodorizing Vehicles and Solvents", will be found a mention of the uses and applications of ESSENTIAL OIL OF COGNAC and other scenting mixtures of great interest to the Varnish Maker.

FORMULA FOR MAKING
SHELLAC SOLVENTS, DILUENTS, VEHICLES AND SPIRIT THINNERS
CHEAPER THAN ALCOHOL.

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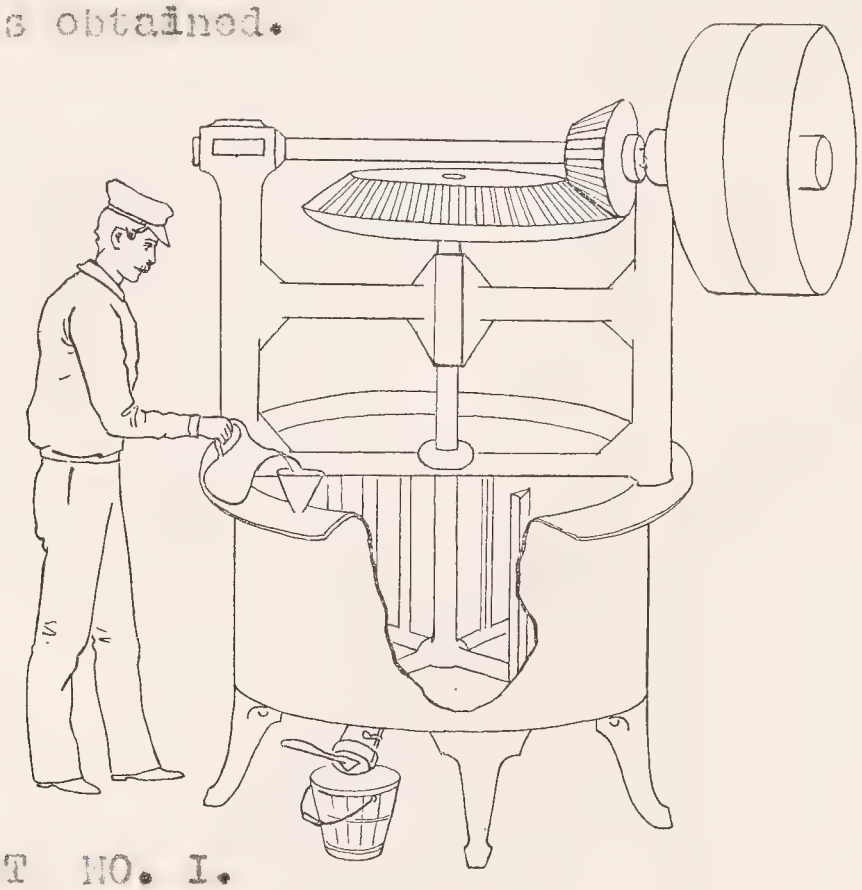
By mixing together, under constant stirring, in an iron mixer such as the one below, the following ingredients in the same order as they are named in the formula, a SHELLAC SOLVENT more economical than Alcohol is obtained.



SHELLAC SOLVENT NO. I.

WOOD ALCOHOL	20 gals.
BENZOLE	10 "
ACETONE	20 "
REFINED FUSEL OIL	10 "
SULPHURIC ETHER	1 lb.
ESSENTIAL OIL OF COGNAC	1/4 oz.

Put Wood Alcohol first in the mixer; put mixer in motion; add the next ingredient, Benzole, gradually, as per cut and through a funnel. Add the next ingredient, Acetone, in the same manner and so on untill all the ingredients have been put in and intimately incorporated. Stop mixer, allow to settle and clarify.

SHELLAC SOLVENT NO. II.

Wood Alcohol	20 gals.
Acetone	10 "
Benzol	10 "
Alcoholized Naphtha	10 "
Essence of Citronella	2 lbs.
Myrbane Oil	1 lbs.

SHELLAC SOLVENT NO. II.

Alcoholized Naphtha	8 gals.
Refined Wood Oil	35 "
Benzole	10 "
Wood Alcohol	20 "

SHELLAC SOLVENT NO. IV.

Deodorized Wood Alcohol	20 Gals.
Alcoholene	10 "
Grain Alcohol	1 "
Essential Oil of Cognac	1 oz.
Benzole	20 gals.

SHELLAC SOLVENT NO. V.

Deodorized Wood Alcohol	20 gals.
Grain Alcohol	5 "
Ether	1 lb.
Essential Oil of Cognac	1/4 oz.

MANUFACTURE OF GRAIN ALCOHOL SHELLAC VARNISHES OF THE HIGHEST GRADE

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HOW TO CUT BLEACHED SHELLAC

SO AS TO PRODUCE A SHELLAC VARNISH ALMOST AS HEAVY IN BODY AS COPAL.

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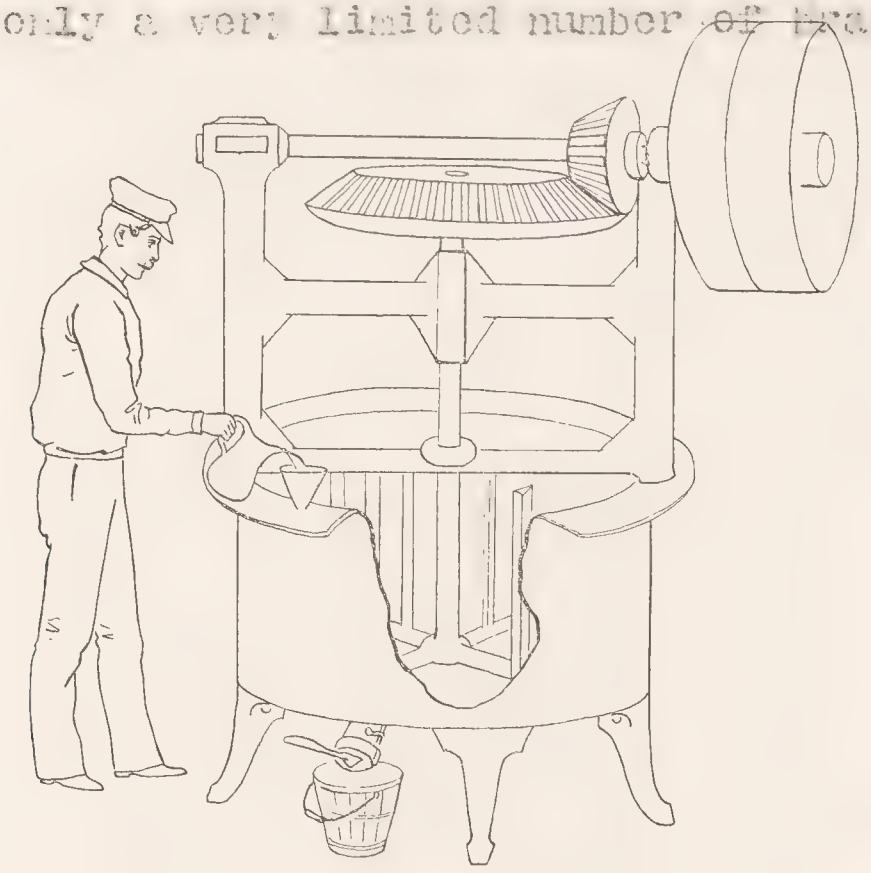
There is a considerable quantity of White Shellac Varnish made and used, but only a very limited number of brands of this article



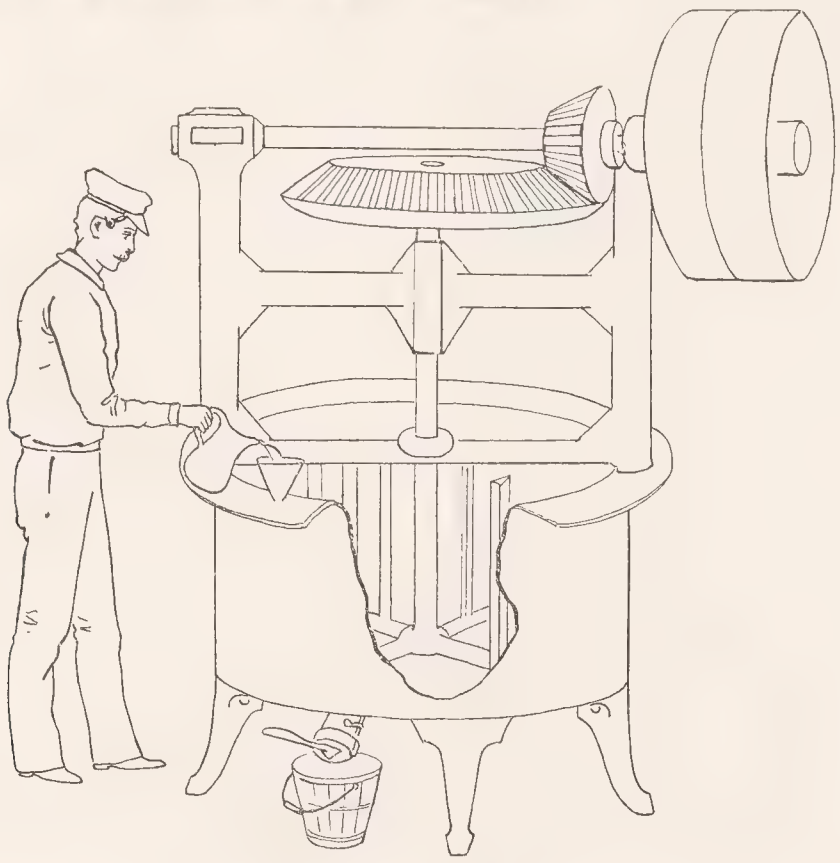
fulfill the requirements of critical buyers as to Body, Flowing, Color and Proper Consistency. For making low grades, substitutes or inferior qualities of Shellac Varnishes, Formulas and Processes will be given. But for the production of the highest grade, here are the complete instructions for making it.

The best apparatus for the purpose is a mixer as per cut.

INSTRUCTIONS FOR MAKING FIRST THE SHELLAC JELLY.

Place in the mixer 100 lbs. of BLEACHED SHELLAC. Add to it: 8 gals. of GRAIN ALCOHOL.

Cover the mixer and let the mixture of Shellac and Alcohol stand over night. The day after, the Shellac will not be dissolved but it will have absorbed all the Alcohol; its volume will have increased about like that of Gelatine which would have been allowed allowed to stand in water over night.



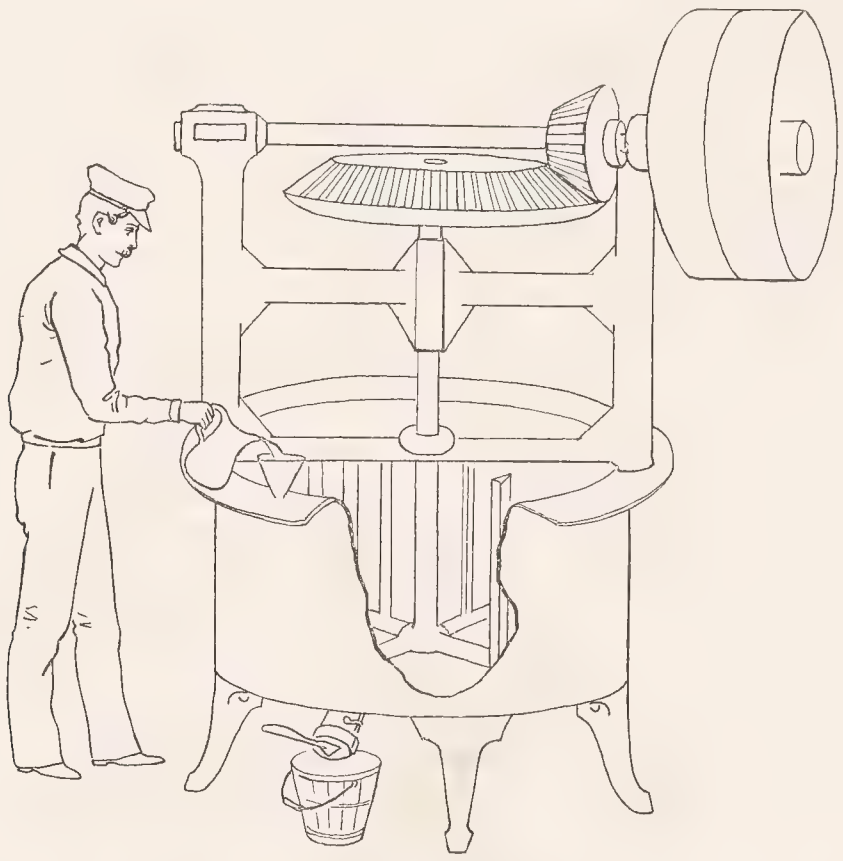
At this moment put the mixer in motion and let it run until the Shellac Gum will be thoroughly disintergrated and there will be no lumps of Gum in the mixture.

We have now in the mixer a heavy paste of thick jelly of Shellac and Alcohol, too heavy to constitute a Varnish, but which can be thinned down to any consistency desired by adding Alcohol.

THINNING DOWN THE SHELLAC JELLY WITH PURE GRAIN ALCOHOL.

When the mixture has assumed the aspect and consistency of a thisk jelly, the BLEACHED SHELLAC is then in the proper condition to be diluted or thinned down with Grain Alcohol.

In the manufacture of what is commercially named PURE ALCOHOL SHELLAC VARNISH, either Wood or Grain Alcohol, free from any other cheaper solvent, is generally used for thinning down the SHELLAC JELLY.



The thinning down of the Shellac Jelly, either with Wood or Grain Alcohol, should be done exactly like the thinning down of any heavy Varnish; but the Alcohol should be added a very little at a time; this point is of great importance, as too much thinner put in at once would produce a curdling instead of a perfect [illegible]ion.

In making Shellac Varnish by the cutting mixer process, as soon as the jelly of Shellac produced by 100 lbs. of the Gum with 8 gals. of Alcohol has been obtained, and while the mixer is in motion, Grain or Wood Alcohol should be gradually added through the funnel figured in the cut, 1 quart at a time, until the preparation assumes the consistency of a GOOD FLOWING SHELLAC VARNISH.

No matter how little Alcohol is added to thin down the SHELLAC JELLY, and how thick or heavy may be the Shellac Varnish, it will,always keep the gum in suspension without showing any tendency to settle or separate from the Alcohol.

As much as 7 1/2 lbs. of White Bleached Shellac can be incorporated by this process in one gallon of Grain or Wood Alcohol, while, by the revolving barrel process, the quantity of 5 to 6 lbs. can hardly be taken up by the same amount of Alcohol.

Furthermore, by the revolving barrel process, the 5 or 6 lbs. of Bleached Shellac in one gallon of Alcohol will not "keep" in suspension, but will always have a tendency to separate from the Alcohol and settle in a short time.

THE CUTTING MIXER PROCESS is not only for making pure SHELLAC VARNISHES OF THE HIGHEST GRADE; there is no better method known to help, mechanically, in increasing the dissolving power of INFERIOR SOLVENTS, ALCOHOL SUBSTITUTES, MENSTRUMS or FILLERS, often used in the production of inferior Shellac Varnishes.

THINNING DOWN THE SHELLAC JELLY WITH ECONOMICAL SOLVENTS CHEAPER THAN ALCOHOL.

Owing to the high price of pure Alcohol, the use of more economical solvents is often resorted to. In Chapter XVII, under the heading "Complete Formulary and Instructions for Manufacturing all Sorts of Solvent Substitutes", will be found seven formulas for making economical Shellac Solvents.

The SHELLAC JELLY should be first made, as per instructions already given. This is, by using eight gallons of either Wood or Grain Alcohol, which are necessary to every 100 lbs of BLEACHED SHELLAC to produce in the cutting mixer the heavy paste or jelly. This jelly is then to be thinned down to any degree of fluidity or consistency desired by the addition of an Alcohol substitute or a Shellac Solvent substitute, such as made per formula above referred to.

In the manufacture of Shellac Varnishes of inferior grades, instead of using either Wood or Grain Alcohol in the proportion of 8 gallons to every 100 lbs. of Bleached Shellac for making the Shellac Jelly and thinning down this Shellac Jelly with Shellac Solvent substitutes, the quantity of pure Alcohol is reduced to 4 gallons to every 100 lbs. of Shellac; the other 4 gallons necessary to produce the Shellac Jelly are Alcohol Substitutes.

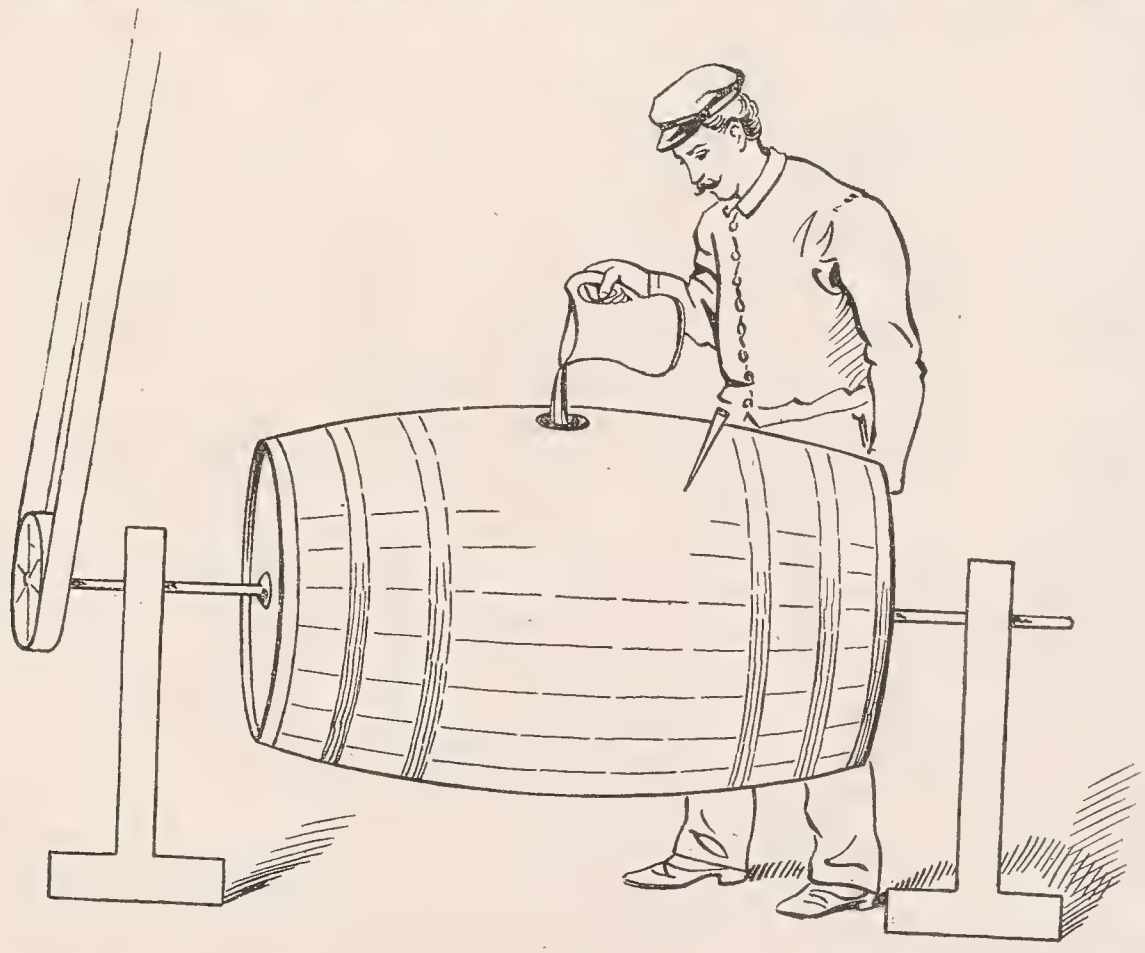
PURE GRAIN ALCOHOL ORANGE SHELLAC.

-:-:-:-:-:-:-:-:-

FORMULA: Put in the Revolving Barrel:

GRAIN ALCOHOL	34 gals.
ACETONE	1 "
SULPHURIC ETHER	1 lbs.

The addition of ACETONE and SULPHURIC ETHER to the GRAIN ALCOHOL will greatly increase the energetic action of the solvent, which will thus ATTACK, CUT and DISSOLVE the Shellac Gum more readily.



The above quantity of Solvent is intended for 200 lbs. of ORANGE SHELLAC. The revolving barrel, with all the ingredients in, should be allowed to run continuously no less than ten hours. The result gives 55 gals. of PURE GRAIN ALCOHOL ORANGE SHELLAC.

PURE GRAIN ALCOHOL ORANGE SHELLAC CONTAINING ROSIN.

-:-:-:-:-:-:-:-:-

FORMULA:

Put in the Revolving Barrel:

GRAIN ALCOHOL	54 Gals.
ACETONE	1 "
SULPHURIC ETHER	1 lb.
ORANGE SHELLAC	200 lbs.
ROSIN "E"	150 "

In mixing Rosin with Orange Shellac in the proportion of 1/4 of the latter to 3/4 of the former, the result is a Shellac Alcohol varnish which dries in about the same time as pure Alcohol Shellac Varnish containing no Rosin; the coating thus produced has an adhesive power fully equal if not superior to, Pure Alcohol Shellac; the only difference noticeable is in the HARDNESS of the coating, which is greater in Pure Shellac Varnish.

In the proportion of 2/3 of Shellac and 1/3 of Rosin, the

result is a varnish drying a little slower and giving a coating much softer. However, a mixture like this, gives yet a fair Shellac Varnish, which can be applied exactly in the same manner and for the same purpose as pure Orange Alcohol Shellac Varnish.

It can be rubbed after 4 to 5 hours if necessary, the second coat giving a high gloss or finish.

§ 1408.

HOW TO IMPROVE A SHELLAC VARNISH CONTAINING ROSIN.

The hardnessof a Shellac Varnish containing Rosin in more or less proportions, can be increased by the substitution of one half of FRENCH ARTIFICIAL MAURI or EXTRA HARD ROSIN PREPARATION.

ABOUT ALKALINE ORANGE SHELLAC VARNISHES.

In cases where the question of cheapness is imperative, the Shellac Alcohol solution is thinned down with a strong Alkali, such as CAUSTIC POTASH or SODA, previously dissolved in twice its weight of boiling water.

The Alkaline solution should be prepared in advance so as to get it ready for use when necessary. For the proportions given in the formula of "PURE GRAIN ALCOHOL ORANGE SHELLAC CONTAINING ROSIN", the amount of Alkaline solution should be 8 lbs. of CAUSTIC POTASH dissolved in 6 gallons of boiling water.

BREWERS' GLAZE OR SHELLAC SUBSTITUTE FOR BEER TANKS.

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For glazing the inside of beer tanks, special shellac compositions are made; and some of these are extensively used for the reason that they answer all the requirements, which are as follows:

A faultless glazing must be:

TASTELESS,

ODORLESS,

INSOLUBLE.

FORMULA:

ORANGE SHELLAC	100 lbs.
TROPICAL ARTIFICIAL GAUM	50 "
SINGAPORE DAMAR	20 "
GRAIN ALCOHOL	34 gals.

The above formula gives a glazing fulfilling all the above requirements. It should be applied on a surface perfectly dry.

1471.

ORANGE SHELLAC IMITATION

made from

AN ECONOMICAL GUM SHELLAC SUBSTITUTE AND FRENCH ARTIFICIAL KAURI.

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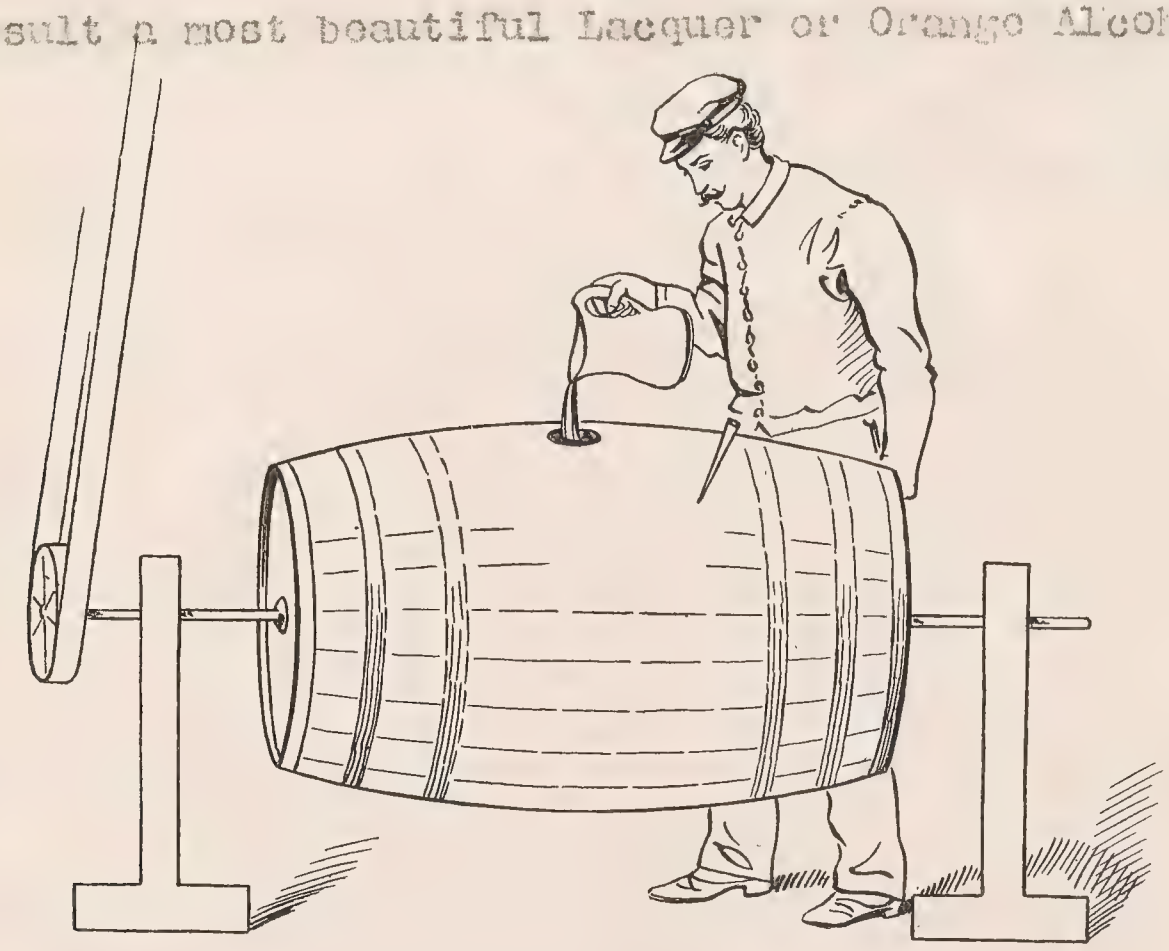
Under the name of SCHEL-LAC GUM (Shellac Substitute) a new and valuable material has been placed on the market by a New York importing house. It is a hard gum which, like Shellac, dissolves readily in the same solvents; it can be mixed with Rosin and gives as a result a most beautiful Lacquer or Orange Alcohol Varnish imi-



tation, that has found already many uses.

FORMULA:	SCHEL-LAC	100	lbs.
	FRENCH ARTIFICIAL KAURI	50	"
	COTTON ROSIN	50	"
	VANILLIN GUM	1	oz.
	ACETONE	5	gals.
	WOOD ALCOHOL	30	"

ORANGE SHELLAC VARNISH IMITATION

FROM MANILA GUM, FRENCH ARTIFICIAL KAURI DISSOLVED IN ECONOMICAL ALCOHOL SUBSTITUTES.

-:-:-:-:-:-:-:-:-

Amongst the substitutes for Shellac placed on the market at a price inconsistent with the use of standard ingredients, there is a sort of Lacquer presenting some of the peculiar features of Orange Shellac as to drying and rubbing properties. It is made from a mixture of Alcohol and another liquid ingredient as a solvent, and MANILA DUST, with or without Rosin, instead of simply Orange Shellac

MANILA DUST dissolves rapidly in Alcohol at an ordinary temperature, giving a rapid Drying Varnish, transparent, but devoid of Flowing.

The exact color of Orange Shellac dissolved in Alcohol is exceedingly difficult to impart to a varnish, and only one coloring has been found to give the yellowish orange tint peculiar to Orange Shellac. This coloring is obtained by dissolving AURINE, a product of mineral origin, in either Wood or Grain Alcohol; this solution gives an Alcoholic tincture, which can be used to impart the color of Orange Shellac to a Rosin or Manila Varnish.

Only one fluid ounce of AURINE TINCTURE, which has been already described under the name of ORANGE SHELLAC ARTIFICIAL COLORING, will be found amply sufficient for coloring one gallon.

1475.

ORANGE SHELLAC VARNISH IMITATION

FROM MANILA GUM, FRENCH ARTIFICIAL MAURI DISSOLVED IN ETHYLICAL ALCOHOL SUBSTITUTES.

F O R M U L A :

MANILA DUST	100	lbs.
FRENCH ARTIFICIAL MAURI	50	"
COTTON NOTIL	50	"
WOOD ALCOHOL	25	gals.
MECHANICAL ROSIN	5	"
ALCOHOL	3	"
AURINE TINCTURE	1	qt.

INSTRUCTIONS:

Put the solid ingredients in the revolving vessel first; then add gradually all the solvents except the "tincture" in the order named as per formula. Put the mixer in motion; let it run from 4 to 5 hours. When all the solid ingredients have been dissolved, color the preparation with the Aurine Tincture. The Varnish is then ready. This is an [illegible] drying varnish.

PART NO. XV.

(See Index on next page).

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S U B J E C T T R E A T E D.

CAUTIONS, FORMULAE AND INSTRUCTIONS FOR MANUFACTURING

ALL SORTS OF

T I N C T U R E S A N D S U B S T I T U T E S.

PAGE NO. XV.

COMPLETE FORMULARY AND INSTRUCTIONS FOR MANUFACTURING

ALL SORTS OF

L I N S E E D O I L S U B S T I T U T E S.

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LINSEED OIL SUBSTITUTE.

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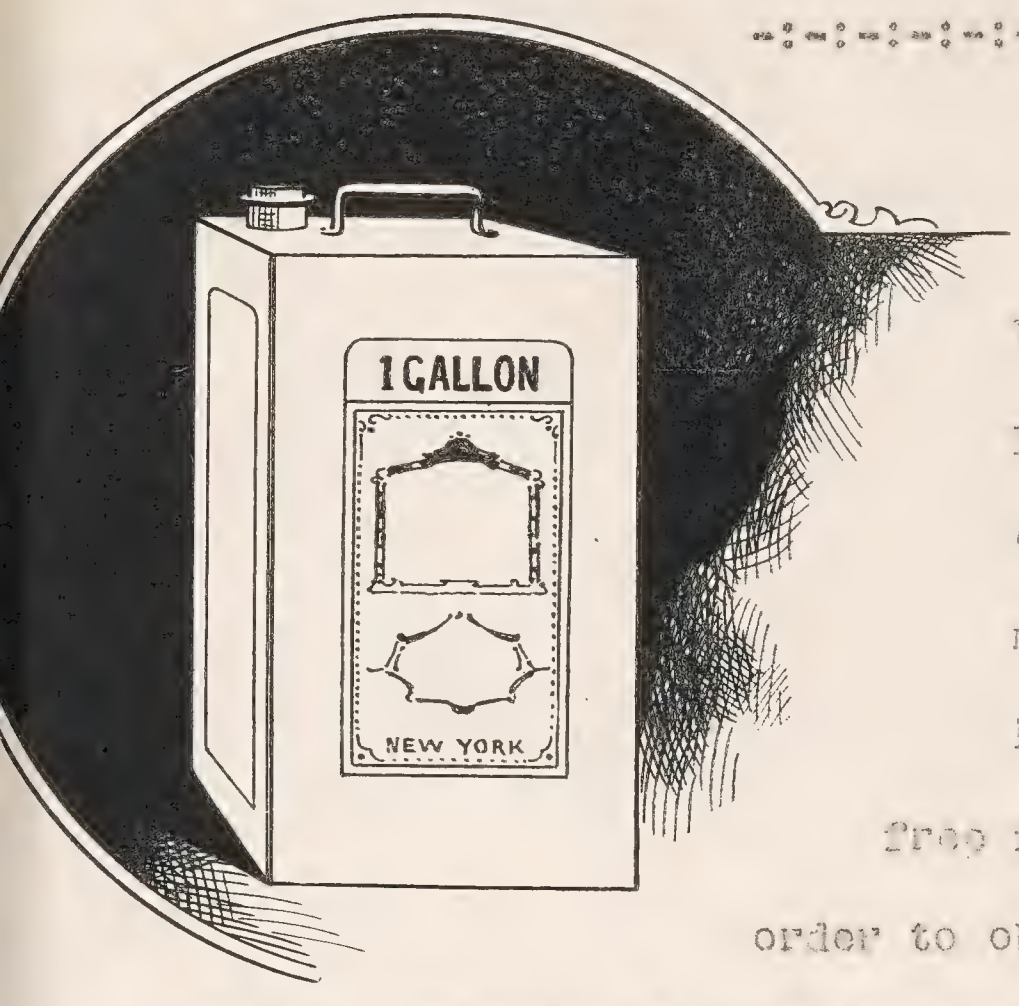

In the manufacture of Mat Varnishes, nothing can take the place of Linseed Oil. It is even necessary to have in the majority of cases a bleached or Refined Linseed Oil perfectly free from mucilage or fatty acids, in order to obtain satisfactory results.

The manufacture of substitutes for Linseed Oil is not, therefore, intended to replace the Linseed Oil in the manufacture of Varnishes; but in the preparation of SPECIAL PAINTS and CHEAP COATINGS where durability and wear are not the first consideration, a demand has been created for a substitute, or better said, for a PAINT OIL having some adhesive power and a reasonable amount of wear.

A economical substitute for Linseed Oil, drying by oxidation, has never been found yet which should be recommended as a reliable article. Experiments are constantly made, but up to date without success. I give hereafter all the results which have been obtained to my knowledge in that direction.

L I N S E E D O I L S U B S T I T U T E N O. I.

GLOSS OIL OR GLOSS PAINT OIL, NOT GRANULATING IN BENZINE, NOT CURDLING IN OIL, NOT LIVERING UP WHEN MIXED WITH WHITE LEAD OR WHITE ZINC FOR USE IN PAINTS, GLOSS COATINGS OR SPECIAL COMPOSITIONS.

-:-:-:-:-:-:-:-:-

Follow instructions given in Chapter X, of the "SCIENCE OF VARNISH MAKING", for the special treatment of Rosin, and make a "BATCH of EXTRA HARD ROSIN PREPARATION, perfectly neutralized. Use the quantities named in the following formula, and when you reach the 14th phase of the process, the preparation is to be thinned down with a mixture of 50 gals. of CAMPHORATED NAPHTHA, 10 gals. of BOILED LINSEED OIL.

FORMULA:

ROSIN "K"	200	lbs.
WATER	3	gals.
GLYCERINE (crude)	4	ozs.
CAUSTIC SODA	6	lbs.
SUGAR LEAD	8	"
HYDRO CARBONE ..	5	"
GROUND GLASS ...	1	"
BOILED LINSEED OIL	10	gals.
CAMPHORATED NAPHTHA	50	"

Allow to cool, settle and clarify before using.

L I N S E E D O I L S U B S T I T U T E N O. 1.

FROM NEUTRALIZED OIL, NEUTRALIZED ROSIN AND LINSEED OIL.

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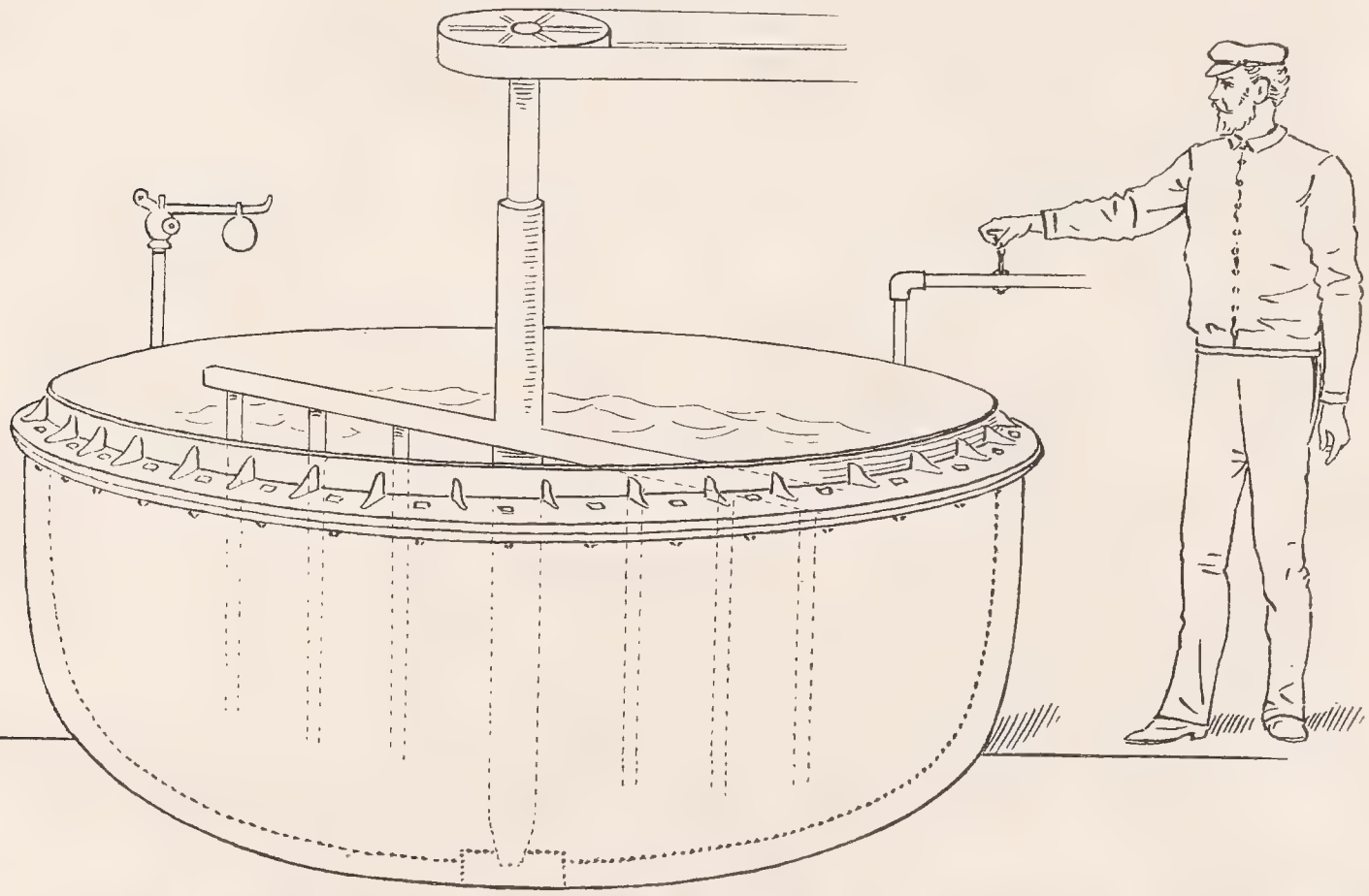
The neutral Oil should first be Doblooned by the use of Nitro-Naphthalene and steam heat.

Put in a Copper pan or Steam Jacketed Kettle provided with



mixer or a stirrer, 100 gals. of the OIL. Turn on the Steam valve and bring the Oil to a temperature of about 180 deg. F. Then shut the steam off and add 8 lbs. of NITRO-NAPHTHALENE. Let the mixer run for about half an hour, more or less, until the whole NITRO-NAPHTHALENE has been thoroughly incorporated; then carry out the contents into a settling tank to clarify, which requires 24 hours.

Neutralize 600 lbs., as per formula given in Linseed Oil Substitute No. 1 (see previous page); and instead of thinning down with Camphorated Naphtha, use the Doblooned Neutral Oil, 100 gals., obtained as per preparation above.

Allow to cool, settle and clarify before using.

L I N S E E D O I L S U B S T I T U T E N O . III.

FROM ADAMANTA RESIN, FRENCH ARTIFICIAL KAURI, PREPARED LINSEED OIL AND KEROSENE.

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Pre are first the French Artificial Kauri, as per formula and instructions given in the next Chapter.

When the French Artificial Kauri is prepared in the kettle, and before allowing to cool and solidify, add to it the ADAMANTA RESIN; and when this is melted and thoroughly incorporated with the French Artificial Kauri, add the PREPARED LINSEED OIL; and finally thin down with KEROSENE. The proportions to be used are indicated in the following formula:

FORMULA:

ROSIN "K"	400 lbs.
WATER	12 gals.
GLYCERINE (crude) ...	8 ozs.
CAUSTIC SODA	12 lbs.
SUGAR LEAD	10 "
HYDRO CALCINE	10 "
GROUND GLASS	2 "
BOILED LINSEED OIL ..	20 gals.
ADAMANTA RESIN	200 lbs.
KEROSENE OIL	90 gals.

Allow to cool and clarify, also settle.

L I N S E E D O I L S U B S T I T U T E N O . I V .

FROM RESINATE OF LIME AND ESTER GUM THINNED DOWN WITH DEBLOOMED NEUTRAL OIL.

-:-:-:-:-:-:-:-:-

Follow the instructions given for making RESINATE OF LIME, which are exactly the same as given in Chapter No. X, of "THE SCIENCE OF VARNISH MAKING" for the preparation of EXTRA HARD RESIN, with the only exception that you drop one ingredient, the Glycerine named in the formula. Add to your RESINATE OF LIME in its melted state, 25% in weight of O. N. E. ESTER GUM. Melt the two together, and when perfectly incorporated, thin down with NEUTRAL OIL previously debloomed, as per process given in making Linseed Oil Substitute No. II.

FORMULA:

ROSIN "K"	200	lbs.
WATER	6	gals.
CAUSTIC SODA	6	lbs.
SUGAR LEAD	6	"
ZINC OXIDE	8	"
GROUND GLASS	1	"
ZINC OIL	30	"
DEBLOOMED NEUTRAL OIL	60	gals.

R U B B E R O I L L I N S E E D O I L S U B S T I T U T E

N O . 7 .

COMBINED WITH ROSIN GLOSS PAINT OIL AND KETTLE BOILED LINSEED OIL.

-:-:-:-:-:-:-:-:-

In a petroleum barrel, mounted on a platform, as per cut here below, put 10 gals. of "D" Para Rubber Solution, commercially named "DIAMOND" PARA RUBBER CLAIM, such as made by Geo. E. Wood Co., 464-466 Atlantic ave., BOSTON, Mass.; or any other rubber solution

corresponding to the above in specific gravity. Add to this 10 gals. gradually under constant stirring, five times as much in volume or 50 gals. of CAMPHORATED BENZINE. This being done, the result is a thin rubber Oil which is to be used as a diluent instead of COMMON BENZINE or CAMPHORATED NAPHTHA, in the formula here below:

FOR 100 GALS:

BOILED "D"	200 lbs.
WATER	5 gals.
GUMCAMPHOR (crude)	4 ozs.
CRUDE OIL	6 lbs
SUGAR LEAD	6 "
HYDRO CALCIUM	5 "
GROUND GLASS	1 "
BOILED LINSEED OIL	5 gals.
RUBBER OIL MADE AS ABOVE	55. "

PAGE NO. XVI.

(See Index on the next page):

APPENDIX "B" CONTINUED:

VOLUNTARY ACTS, INCLUDING THE CONSTRUCTION AND MODE OF

SUPPLY SUPPLY FOR VARIOUS HEAD GUNS.

PART NO. XVI.

COMPLETE FORMULARY AND INSTRUCTIONS FOR MANUFACTURING ALL SORTS OF

S U B S T I T U T E S F O R V A R N I S H H A R D G U M.

-:-:-:-:-:-:-:-:-:-

MANUFACTURE OF SUBSTITUTES FOR FOSSIL RESINS

OF

V A R N I S H G U M S U B S T I T U T E S.

-:-:-:-:-:-:-:-

Economy being an imperative question in no less than four-fifths of the entire production of varnishes manufactured and sold in the United States, prominent chemists and progressive Varnish makers have, for the past fifteen years, directed their attention to improving the working qualities of COMMON ROSIN, so as to use this cheap material under the most favorable circumstances and to the best advantage, in Varnish Making.

The results obtained up to date in that direction have a considerable importance, and seem to point out already to a notable decrease in the annual consumption of FOSSIL RESINS, and a corresponding increase in the uses and applications of COMMON ROSIN, conveniently treated.

Questions concerning the treatment and hardening of Rosin, the production of Resinate of Lime, and Resinate of Glycerine and all the Resin preparations which interest so highly the modern Varnish Maker, are treated at length in Chapter X of "THE SCIENCE OF VARNISH MAKING", with full particulars concerning the best formulas and processes in existence.

PRINCIPLES UPON WHICH IS BASED THE MANUFACTURE OF ALL SORTS OF

C O P A L G U M S U B S T I T U T E S

From a Special Treatment of Common Rosin, so as to get as a result a Perfectly Neutralized and Hardened Resinous Compound Soluble in OIL, TURPENTINE AND NAPHTHA, WITHOUT DRYING TACKY.

-:-:-:-:-:-:-:-:-

Melted Kauri Gum, being entirely soluble in MELTED ROSIN, is, therefore, miscible in all proportions with RESINATE OF LIME, RESINATE OF GLYCERINE or EXTRA HARD ROSIN previously neutralized. Consequently, if a certain amount of Kauri XX is first melted and perfectly liquefied by heat in an ordinary Copper rettle, this Melted Kauri can be then diluted or THINNED DOWN with any amount of LIQUEFIED or MELTED ROSIN exactly as it could be thinned down with Prepared Oil, Turpentine, Naphtha or any other diluent.

The only difference is that in the case of THINNING DOWN MELTED KAURI with a diluent such as prepared Oil or Turpentine, which remains liquid at an ordinary temperature, the resulting mixture of Melted Kauri and diluent will remain liquid after cooling, thus making a varnish having more or less consistency according to the proportions of liquid thinners used; while in the case of THINNING DOWN MELTED KAURI with a diluent such as MELTED ROSIN, which solidifies immediately after cooling, the resulting mixture , after

being allowed to cool, will give NOT A VARNISH but a compound SOLID RESIN, the hardness of which will depend upon the relative hardness of the ingredients.

As has already been said, there are three great objections to the use of COMMON ROSIN in Varnish Making:

1st. ITS SOFTNESS. 2nd. ITS BRITTLENESS.

3rd. ITS ACIDITY.

Two of these objections, the BRITTLENESS and the ACIDITY, have been removed by the treatment already explained in the process given for neutralizing Common Rosin and making the Resinate of Lime or Glycerine. As to the greatest objection, the SOFTNESS, it has been removed only to a certain extent through the hardening effect of the Lime. The last improvement that experience suggests, consists in increasing this hardness by the addition of a small proportion of FOSSIL RESIN, which will also increase the TOUGHNESS and the adhesive power of the Compound Resin or finished product.

Another advantage deriving from the association of a certain amount of Hard Gum to prepared Rosin, is a PREVENTION FROM THE ROSIN DRYING TACKY.

As can be seen from the above, many, if not all, the peculiar characteristics of ZANZIBAR, NORTH COAST, ANGOLA, BENGUELA and KAURI can be imparted to COMMON ROSIN:

1st. BY THE PROCESS OF NEUTRALIZING AND HARDENING COMMON ROSIN.

2nd. BY THE ADDITION OF A SMALL PROPORTION OF A FOSSIL RESIN.

S U B S T I T U T E F O R R E S I N C O P A L S.

-:-:-:-:-:-:-:-:-

Improved Method and Process for the Special Treatment of Common Rosin in the Production of a Substitute for Hard Gum or Artificial Kauri Gum or Copal Resins used in the Manufacture of Fine Varnishes.

-:-:-:-:-:-:-:-:-

FRENCH ARTIFICIAL KAURI GUM.

The treatment of COMMON ROSIN for the production of Substitutes for Copal Gums requires two different operations:

1st. THE NEUTRALIZATION OR HARDENING OF COMMON ROSIN.

2nd. THE PROPER BLENDING WITH A POSSIL RESIN.

1st. OPERATION: For neutralizing and hardening Common Rosin, follow exactly all the instructions given in Chapter I of "THE SCIENCE OF VARNISH MAKING", for making what is called EXTRA HARD ROSIN PREPARATION, until you have reached the fourteenth phase of the operation. As to the proportion of

ingredients, use 3 times the quantity named in the formula, or

ROSIN "M"	600 lbs.
WATER	16 gals.
GLYCERINE (crude)	12 oz.
CAUSTIC SODA	18 lbs.
SUGAR LEAD	24 "
HYDRO CARBON	15 "
GROUND CHALK	3 "

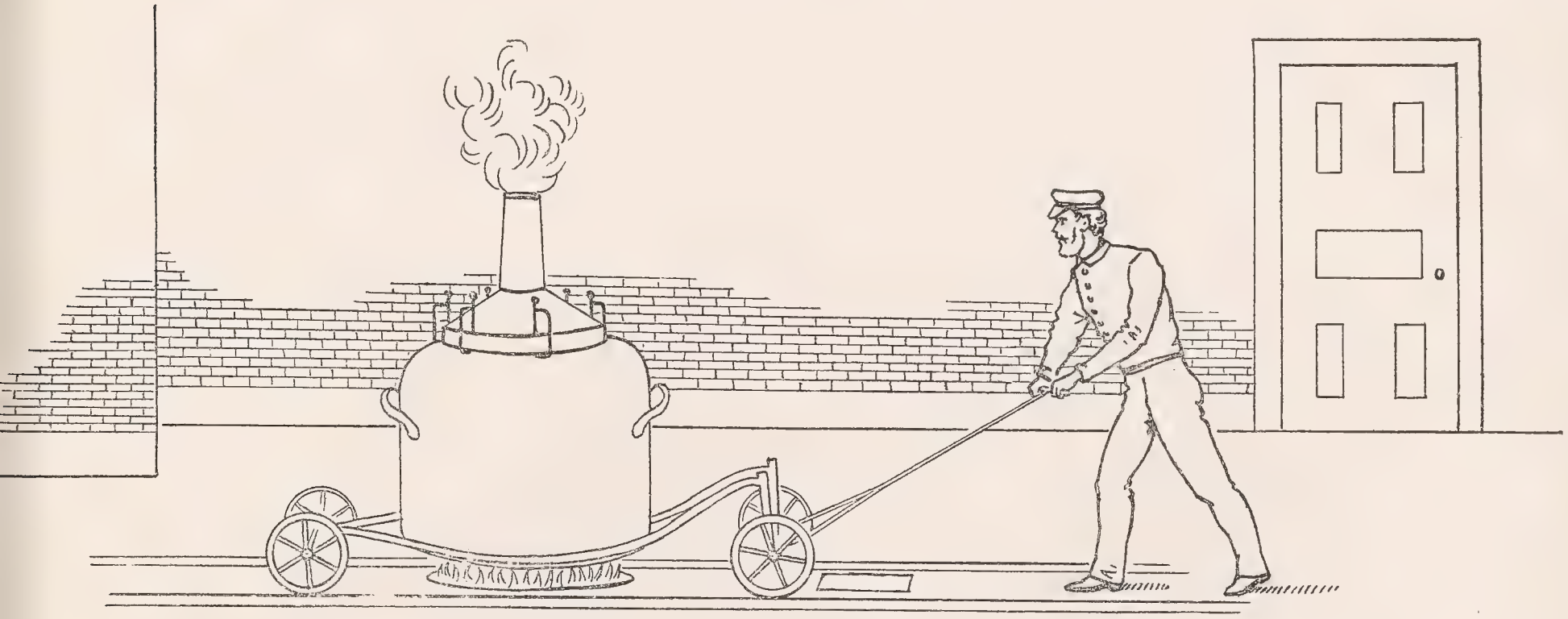
As soon as you reach the fourteenth phase of the process explained in all its details in Chapter II, already referred to, we will have them in the steam jacketed kettle, 60 gals. of a MELTED ROSIN perfectly neutralized, which in its liquid state has about the same consistency as hot linseed oil.

This Prepared Resin should be maintained in its liquid state by steam heat and kept in the Steam Jacketed kettle for future use in thinning down, or better said in mixing it with 50 lbs. of MELTED KAURI, as per instructions given in the 2nd operation, which is described at length hereafter.

Leave the steam valve open just enough to keep the Resin Preparation in a liquid state, then proceed to melt your Kauri.

In this case the proper blending is to be made with K Kauri. Weight, 5 lbs. of K Kauri. Put it in an ordinary Copper Kettle, melt it, and when perfectly liquid by heat, be sure that all the dampness and resinous fumes have been volatilized; remove the kettle from the fire and carry it near by the Steam Jacketed Kettle, where the Resin preparation in a liquid state has been left after the 1st Operation.

Add gradually the whole contents of the Steam Jacketed Kettle to the copper kettle, and then the 60 gals. of MELTED RESIN PREPARATION have been added to the 3 gals. or 50 lbs. of MELTED KAURI, and under constant stirring, the Copper Kettle containing the mix-



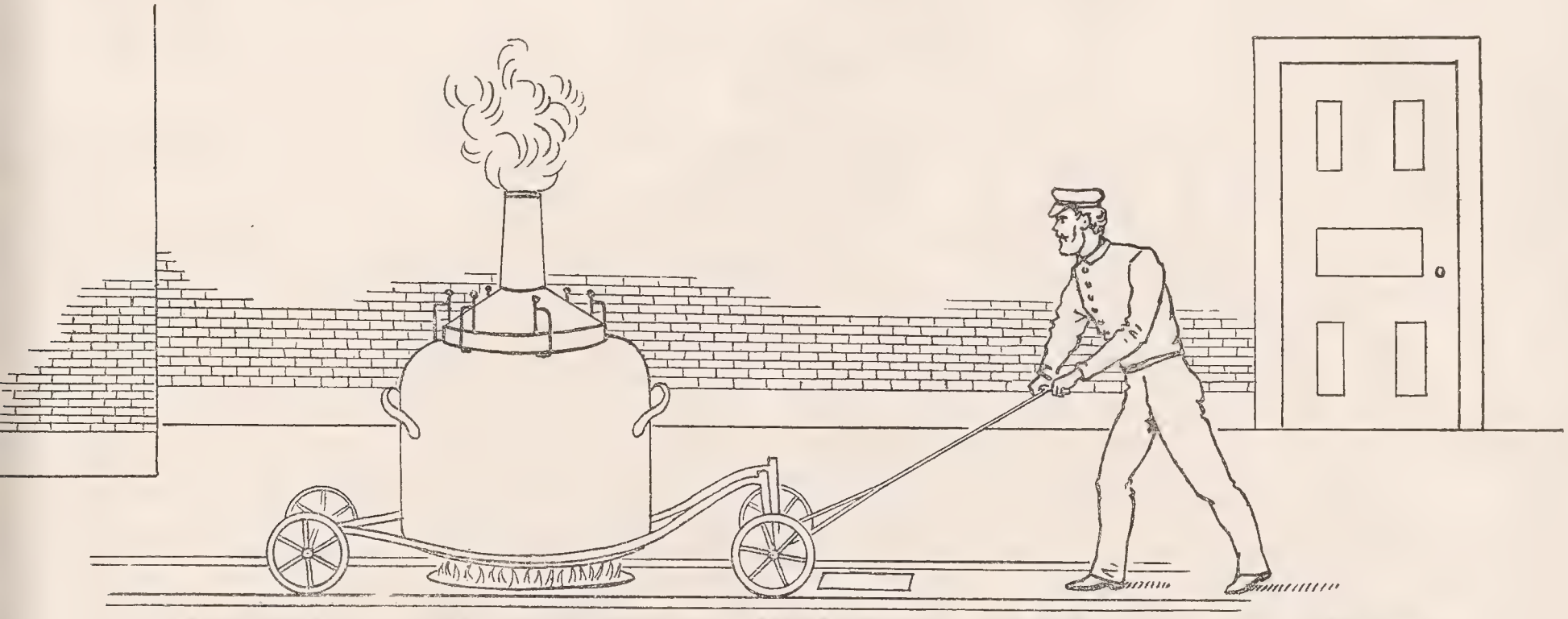
ture is then brought over the fire place again and heated for five to ten minutes longer until MELTED KAURI and MELTED ROSIN are perfectly incorporated together. The kettle is then removed from the

fire and the compounded Rosin in its liquid state is then poured into a suitable cooling vessel, where after twenty four hours it wil be perfectly solidified.

When cold and solid it is cut up into large lumps and packed in cases ready for shipment.

The result of the above operation gives 680 lbs. of a resinous compound which presents in its solid state many of the peculiar characteristics of Kauri.

With this preparation, which is called FRENCH ARTIFICIAL KAURI, Varnishes can be made that will mix with Manila. French Artificial Kauri will melt and work with Manila Gum in the varnish kettle, which is not the case with genuine Kauri.



A Varnish made from FRENCH ARTIFICIAL KAURI will dry with a high gloss; its price will be comparatively low, and such varnish will be very valuable for Furniture, as it will not dry tacky, as is the case with cheap Furniture Varnishes made from Rosin.

E C O N O M I C A L S U B S T I T U T E S F O R

ZANZIBAR, ANGOLA, BENGUELA, NORTH COAST AND SIERRA LEONE,

Could be made exactly as per instructions given for making the FRENCH ARTIFICIAL KAURI. Instead of using K or E Common Rosin, W. W. Rosin or Water White Rosin should be used; and ZANZIBAR, ANGOLA, BENGUELA and SIERRA LEONE in moreor less proportions, instead of Kauri.

By the addition of a Fossil Resin to a preparation of Common Rosin, previously neutralized and hardened, the resulting product or substitute for Hard Gum will be modified and the peculiar characteristics which it will present will partake of the nature of the various ingredients associated together.

Should Common Rosin be added to any kind of Gum, either Zanzibar, BENGUELA, ANGOLA, NORTH COAST or SIERRA LEONE, without having been previously neutralized, hardened, as per process given, a Varnish resulting from a compound Rosin prepared in this manner would always dry tacky.

Although some substitutes for Fossil Resin, manufactured on a large scale, have met with success, the Varnish maker must not lose sight of the fact that they are only applicable to medium grades or inferior grades; but not to the very highest grades of HARD DRYING and WEARING BODY or FINISHING VARNISHES in which EXTRA PALE ZANZIBAR, NORTH COAST or BENGUELA are none too good.

V A R N I S H M A K I N G

F R O M T H E U S E O F E S T E R G U M S.

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Amongst the best preparations offered to the Varnish Maker as substitutes for Fossil Resins, Copal Gums or Varnish Gums of exotic origin, the ROSIN ACID ETHERS, manufactured in Germany by Dr. Eugene Schaal, have met with the approval of critical buyers not only in Germany but also in France and the United States.

ESTER GUMS or ROSIN ACID ETHERS are perfectly neutral preparations obtained by the treatment of the natural Resin Acids with an alcohol glycerine. Unlike Resin, they are insoluble in ALCOHOL and in ALKALINE CARBONATES; but easily soluble in BENZINE, TURPENTINE and OILS, WITHOUT ANY LOSS OF WEIGHT OR BULK.

Varnishes made from ESTER GUMS, instead of ripening by age, as is the case with Varnishes made from natural Gum Resins, may be considered simply as solutions of Resin Acid ethers in fatty or essential

Oils which do not require long keeping in the Varnish tank in order to develope their qualities throug maturation, providing that the Oil from which such Varnishes are made possesses already the necessary degree of ripeness.

An Iron Steam Jacketed Kettle in which Prepared Linseed Oil can be conveniently heated, is all that is necessary to make Varnishes from ESTER GUM.

Dr. Schaal proposes the following way of manufacturing Ester Varnishes. Good old Linseed Oil is heated in large quantities to a temperature of 220 to 280 deg. F., with 5 per cent. of Burnt Umber. The Oil is decanted after 24 to 48 hours and kept in a warm room from three to five weeks. This clarified Oil is heated in an enamel kettle in quantities of about 50 to 100 gals. up to 610 deg. F., until it is at least as heavy in body as the Oil resulting from the similtaneous heating of the Gum and Oil in the ordinary process of Varnish making. The [illegible] Oil is allowed to cool down to 450 deg. F.; and to 100 gallons of this Oil is added a mixture .....

ture of 50 gallons of Turpentine and 10 gallons of liquid drier, as per formula here below.

DR. EUGENE SCHAAL'S FORMULA FOR MAKING A LIQUID DRIER TO BE USED IN PRODUCING VARNISHES FROM ESTER GUMS.

Heat 10 gals. of Oil Linseed Oil up to 300 deg. Fr., and while at this temperature add gradually to it a mixture of 1 1/2 parts in weight of Oxide of Manganese, 7 1/2 parts of Red Lead and 7 1/2 parts of Litharge, under constant stirring. Then heat up to about 400 deg. F., and continue the cooking until samples taken from the kettle can be rolled up into pills; at this moment remove the kettle from the fire and cool down with 40 parts of Turpentine, and filter.

The above Oil Mixture forms the basis of Dr. Schaal's Ester Varnishes, which are produced by dissolving the Ester Gum at a temperature of not above 275 deg. F., and thinning down with Turpentine if required.

After giving the above formula, Dr. Schaal adds: These are only the broad outlines of a rational process of manufacturing Ester Varnishes. It may be modified according to the quality of the Varnish to be produced.

For ELASTIC OUTSIDE FINISHING VARNISH, Dr. Schaal recommends the addition of a small quantity of a solution of India Rubber in Spirits of Turpentine.

V A R N I S H M A K I N G

F R O M T H E U S E O F A D A M A N T A G U M S.

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Adamanta Varnish Gum is another economical substitute for Fossil Resin which can be used in place of more expensive natural Gums for the preparation of AGRICULTURAL IMPLEMENT VARNISHES, FURNITURE, COACH, and also for making, with special diluents, vehicles or thinners, economical coatings or Linseed Oil Substitutes.

Adamanta Resin is a second quality of the above gum, especially used for Linseed Oil Substitutes or economical coatings.

The manufacture of Varnishes by the use of ADAMANTA VARNISH GUM, is exceedingly simple and can be conducted in a steam Jacketed Kettle.

The Oil is heated and the Adamanta Gum readily dissolves in it at a temperature of about 300 deg. F. The Varnish thus made can be considered simply as a solution ready for use immediately after it has been made.

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(See Index on this and page.)

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COMITÉ [illegible] DES HOTELS POUR [illegible]

[illegible]

AU [illegible] POUR [illegible] ET [illegible].

PART NO. XVII.

COMPLETE FORMULARY AND INSTRUCTIONS FOR MANUFACTURING ALL SORTS OF SUBSTITUTES FOR SOLVENTS AND DILUENTS.

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E C O N O M I C A L S U B S T I T U T E S

FOR SOLVENTS, DILUENTS AND THINNERS USED IN VARNISH MAKING.

-:-:-:-:-:-:-:-:-:-

DEODORIZED NAPHTHA:

Common Naphtha, 65 deg. can be rendered miscible in the proportion of 50% in either Wood or Grain Alcohol, by a previous treatment. In Chapter VI of the "SCIENCE OF VARNISH MAKING", complete instructions have been given how to deodorize Naphtha.

The process of making DEODORIZED NAPHTHA is exactly the same, with the only exception that in the formula given, 1 gal. of Wood or Grain Alcohol should be substituted for and used in place of the 1 gal. of Fusel Oil which I have mentioned.

TURPENTINE SUBSTITUTE:

Under the heading of "QUESTIONS OF SOLVENTS, VEHICLES AND THINNERS, in Part No. V of "THE SCIENCE OF VARNISH MAKING", I have described a process for bodying BENZINE. (See page 115 for that process).

Under the name of "DEE OIL", an English manufacturing concern is producing successfully an economical substitute for Turpentine which leaves a resinous residue like Turpentine by evaporation. similar result can be obtained by the process I have already given for making CAMPHORATED BENZINE or CAMPHORATED NAPHTHA.

ALCOHOL SUBSTITUTE NO. I.

By mixing the following ingredients together, a solvent, more economical than alcohol, is obtained.

METHYL	10 gals.
ACETONE	40 "
REFINED FUSEL OIL	5 "
SULPHURIC ETHER	1 lb.
ESSENTIAL OIL OF COGNAC	1/4 oz.

ALCOHOL SUBSTITUTE NO. II.

CRUDE FUSEL OIL	70 gals.
ACETONE	10 "
WOOD ALCOHOL	15 "
ESSENTIAL OIL OF COGNAC	1/4 oz.

SHELLAC BOTTLES NO. III.

REFINED FUSEL OIL	45 gals.
METHYL	10 "
WOOD ALCOHOL	30 "
ALCOHOLIZED NAPHTHA	8 "

ALCOHOL SUBSTITUTE NO. IV.

ALCOHOLIZED NAPHTHA	10 gals.
ACETONE	18 "
WOOD ALCOHOL	30 "
ESSENCE OF CITRONELLA	2 lbs.

GRAIN ALCOHOL SUBSTITUTE NO. V.

DEODORIZED WOOD ALCOHOL	50 gals.
GRAIN ALCOHOL	2 "
WATER	1 lb.
ESSENTIAL OIL OF COGNAC	1/4 oz.

LIQUOR SUBSTITUTE NO. VI.

[illegible]	50 gals.
[illegible]	17 "
[illegible]	3 "
[illegible]	1 "
[illegible]	1/4 oz.

ALCOHOL SUBSTITUTE NO. VII.

[illegible]	3 gals.
[illegible]	7 "
[illegible]	15 "
[illegible]	30 "
[illegible]	1/4 oz.
[illegible]	1 lb.

The various formulas above referred to can be mixed in an ordinary barrel, as was fully explained in "[illegible] AND [illegible] MIXING", Chapter VI, on "Mixtures of Coloring Vehicles and Solvents."

PART NO. XVIII.

COMPLETE FORMULAE AND INSTRUCTIONS FOR MANUFACTURING ALL SORTS OF PRINTING INK AND LITHOGRAPHIC VARNISHES.

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L I T H O G R A P H Y

O F

PRINTING INKS, PRINTERS' AND LITHOGRAPHERS' VARNISHES.

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The manufacture of Printing Inks, Printers' Varnishes, Lithographers' Varnish Oils and Bitumens and Vehicles, involves many special processes, methods and formulas belonging to the art of making Varnish as well as the art of mixing colors.

Experienced Varnish makers can produce Varnish Oils which are faultless for certain lines of Printers' and Lithographers' Inks. In fact, the treatment of Linseed Oil, the cooking and the thickening down is exactly the same in printing inks and in varnishes. But where a special knowledge is absolutely necessary is less in the preparation of Linseed Oils than in the technicalities of their application to the printing press.

It is absolutely necessary to know what the behavior of all the other ingredients will be in the Varnish Oil, in order to produce a Printing Ink which will fulfill the requirements of pressmen.

According to the class or the color of Pigments which have to be ground in the Varnish Oil, for making the printing or lithographing ink, the c[illegible]in[illegible], the [illegible]ing and oxidizing of the Oil must be

conducted especially. So it is the case, according to the class of press-work for which the printing ink is intended. An Oil, oxidized to the highest degree, is, in some instances, required; while in other cases this oil would be found too thick, and what is termed a "sharp print" could not be obtained with it.

Electrotype Cuts, Wood Cuts and Fine Engraving on metal, or on lithographers' stones, for the reproduction of delicate work, such as bank notes, require a special printing ink, neither too fluid nor too thick; as, if the ink is too fluid, it will fill the fine lines of the electrotype cut, rendering a fine reproduction utterly impossible. If too thick, the reverse will be the case - the roller will not take enough ink at a time, and a lack of uniformity will be the result in the print.

There are many practical points in the application of printers' and lithographers' ink, either in black or in color, which require all the experience and sagacity of a good operator for getting satisfactory results. In other words, the best printing ink, improperly used, will not produce good work; the proper inking of the roller has a great influence upon the result in fine printing and lithographic work.

The following methods, formulas and processes for making printing inks of every description, are the result only of experience.

In this line of goods, chemical investigation is of but very little help, if any; all rests entirely on the technicalities that practical experience only can teach.

1810.

LITHOGRAPHERS' AND PRINTERS' HEAVY BODY VARNISH OIL NO. I.

FORMULA:

Linseed Oil..... 50 gals.

Borate of Manganese..... 6 lbs.

Bring the kettle on fire; heat the oil up to 610 deg. F. as rapidly as possible. Then take the kettle off fire and allow the Oil to cool down to 400 deg. F. as quickly as possible. At this stage, add gradually the 6 lbs. of Borate of Manganese, under constant stirring. When froth has been subdued, heat up to 600 deg. quickly. Then take kettle off the fire; cool down to 200 deg. F. then leave at this temperature during seven hours consecutively. The result is very heavy, oxidized oil, intensely.

The various applications of this Heavy Body Varnish Oil will be at length explained in the various formulas described further on

Where this oil is applied, no other kind can take its place.

1880.

LITHOGRAPHERS' AND PRINTERS' MEDIUM BODY VARNISH OIL NO. 2.

F O R M U L A :

LINSEED OIL	50 gals.
GRANULATED MANGANESE	8 lbs.
CALCINED UMBER	1 "
SAL AMMONIAC	1 "

Bring kettle on fire; heat your 50 gals of oil up to 300 deg. Fah.; then mix thoroughly together (dry) the Granulated Manganese and the Sal Ammoniac. When froth has been subdued, and the chemicals taken up, increase heat about 1 degree per minute until you reach 610 deg.; take kettle off fire; allow the Oil to cool down to 400 deg. F., then add the Umber; mix thoroughly, using whip allow to cool. The result is a much darker Oil than the Oil No. 1, and especially intended for fine black, Bronze, Blue and Green Ink.

The applications of LITHOGRAPHERS' AND PRINTERS' MEDIUM BODY VARNISH OIL NO. 2, are entirely different from those of the Varnish Oil, No. 1, and it will be noticed in the various formulas hereafter mentioned.

1830.

LITHOGRAPHERS' AND PRINTERS' LIGHT BODY VARNISH OIL NO. 3.

F O R M U L A :

LINSEED OIL	50 gals.
LITHARGE	100 lbs.
RAW UMBER	50 "
RED LEAD	15 "

Put in your kettle the Linseed Oil; bring kettle on fire; heat up to 600 deg. F.; then allow to coolto about 300 deg. F. At this stage, add gradually under constant stirring, a mixture composed of:

LITHARGE	100 lbs.
RAW UMBER	50 "
RED LEAD	15 "

Then boil up again, very slowly, to 600 deg. F., subdueing the froth when this is produced; as soon as 600 deg. F. have been reached, take kettle three to four feet from the fire; let the preparation simmer gently by the action of the heat radiated from the furnace. When all bubbles and froth have disappeared and the surface of the Oil is perfectly clear, remove the kettle from fire,

take it to the thinning room and thin down with;

50 gallons of Fresh Raw Linseed Oil.

The result is a varnish oil a little heavier than ordinary Linseed Oil, quick drying and very elastic. We will refer to it further in the formula for making Printing Inks from it.

1840.

ROSIN OIL PRINTING INK NO. 4.

Ordinary Black Printing Ink for newspapers and common printing can be made without Linseed Oil or Varnish Oil, and satisfactory results are thus obtained in applications where the question of cheapness is imperative.

ROSIN OIL (first run) is used in this case. After being heated to 300 deg. F. in a closed vessel or an ordinary varnish kettle, provided with a cover, this "First Run Rosin Oil" is added to melted Rosin previously hardened and neutralized as per process.

For every 100 lbs. of FRENCH ARTIFICIAL KAURI made from Rosin, 20 gals of Rosin Oil are required. (See "Hardening ROSIN and FRENCH ARTIFICIAL KAURI made from Rosin). The mixture should be kept on fire no longer than 30 minutes, after which it is slightly diluted with 3 gallons of ordinary Naphtha.

When cold, the above preparation is used for grinding either

Bone Black or Lamp Black in a proportion whic varies according to the specific gravity of the Black and its absorbing power for Oil.

We give hereafter the various formulas for making all sorts of Printing Inks from the above diluents or solvents and all kinds of Pigments, Lakes or Dry Colors especially required in each case for obtaining the best results.

-:-:-:-:-:-:-:-:-

§ 1050.

FORMULAS, METHODS AND PROCESSES

for

MAKING PRINTERS' AND LITHOGRAPHERS' INKS OF EVERY DESCRIPTION.

COMMON BLACK PRINTING INK FROM ROSIN OIL, PREPARED ROSIN AND LAMP BLACK,

FOR NEWSPAPER PRINTING.

F O R M U L A :

OIL NO. 4	10 gals.
SOAPSTONE OR FINE TALC	12 lbs.
LAMP BLACK	20 "
FINELY POWDERED PRUSSIAN BLUE	1 "

If not thick enough, thicken with SOAPSTONE.

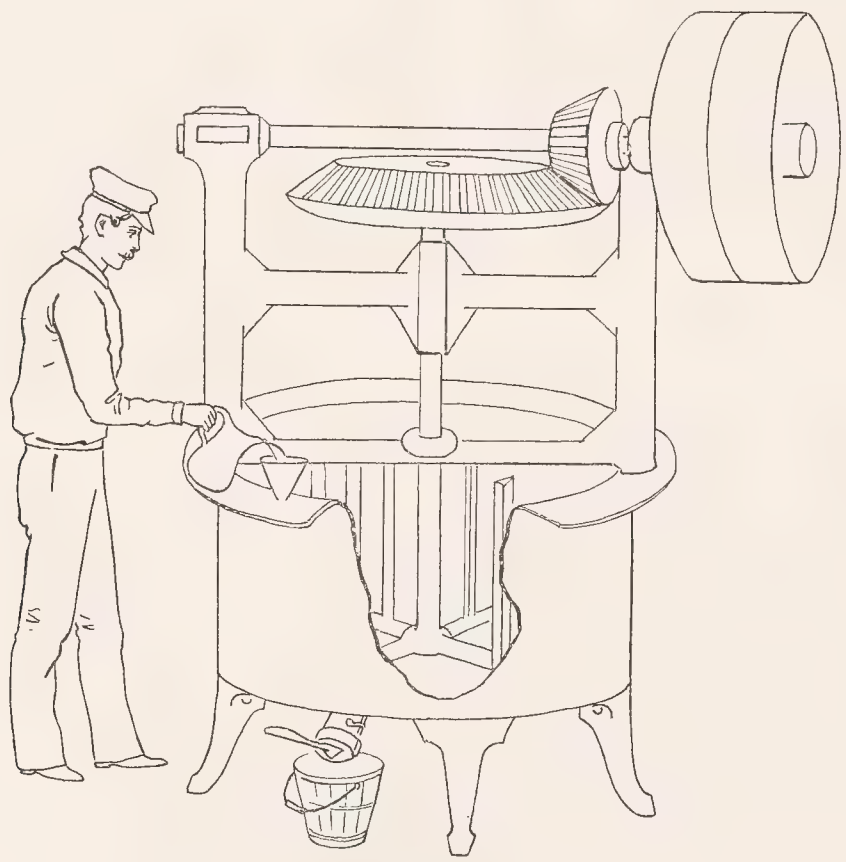
1855.

INSTRUCTIONS CONCERNING THE MECHANICAL PART OF THE MANUFACTURE OF

A L L S O R T S O F P A I N T I N G I N K S.

-:-:-:-:-:-:-

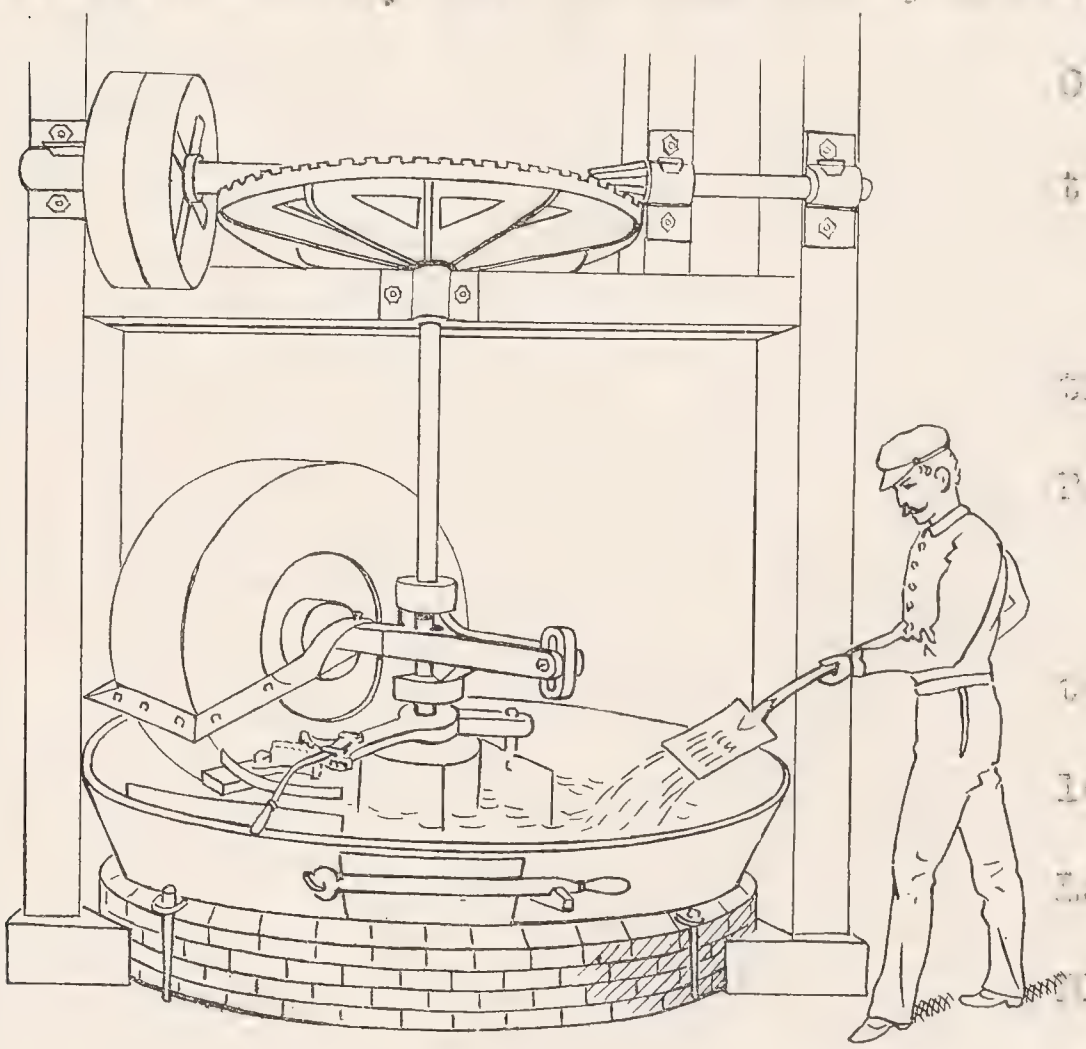
The first thing to be done is to produce a stiff mixture or paste by the incorporation of a very small proportion of Varnish Oil to the pigment or color.



Put into the mixer about one inch deep of the Varnish Oil to be used, or only just enough to cover the bottom of the mixer. Then add a certain amount of the pigment and put the mixer in motion until a stiff and heavy paste, free from lumps, is produced. For this operation, a POWER MIXER, a KNEADING MACHINE, a GRASER or

a PAN MILL can be used. A more perfect mixture, and a much finer paste, can be obtained from the use of a CHASER, as per cut here below.

This frist operation of producing a thick paste should be conducted so as to get from the mechanical action of the mixer enough homogeneity to insure an easy and uniform grinding of that paste through a STONE ROLLER MILL. If the paste is too thick, dilute it, or better said, thin it down a very little with some of the Varnish



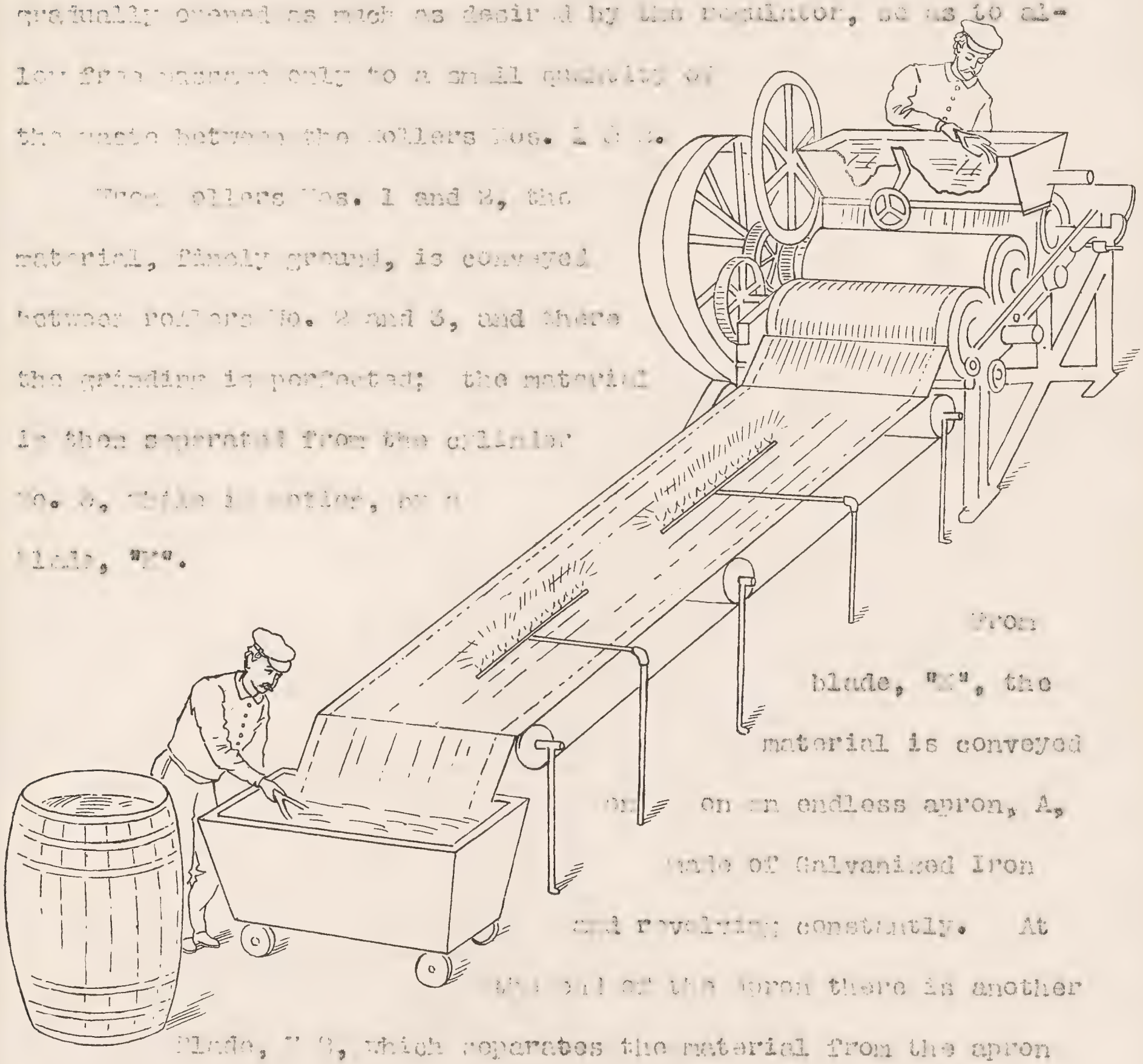
Oil or the Rosin Oil mentioned in the formula.

If the paste is too thin, stiffen with Finely Powdered Carbon.

Prussian Blue is intended to correct that yellowish tinge peculiar to Lamp Black or Hydro Carbon Black; it imparts to cheap Lamp Black that rich, velvety tint of an expensive Ivory Black, and counteracts the tendency of the Printing Ink to turn yellow through exposure to light. Prussian Blue should not be used in lumps but very finely powdered.

When the paste of Pigment and Varnish Oil is perfectly homogeneous, it is then to be carried into the hopper of a Stone Roller Mill, as per cut.

The lower part of the hopper, which is in the shape of a V, is gradually opened as much as desired by the regulator, so as to allow free passage only to a small quantity of the paste between the rollers Nos. 1 & 2.



From rollers Nos. 1 and 2, the material, finely ground, is conveyed between rollers No. 2 and 3, and there the grinding is perfected; the material is then separated from the cylinder No. 3, this by another, by a blade, "r".

From blade, "r", the material is conveyed on an endless apron, A, made of Galvanized Iron and revolving constantly. At the end of the apron there is another blade, "s", which separates the material from the apron so as to collect it in recipient R.

1860.

ELECTROTYPE CUT FINE PRINTING INK.

F O R M U L A .

LINSEED OIL VARNISH OIL NO. 2 (See Formula)..	10 gals.
SOAPSTONE FINELY POWDERED	15 lbs.
TRANSFORT IVORY BLUE BLACK	35 "
PRUSSIAN BLUE	1 "

INSTRUCTIONS:

Same method of mixing and grinding. This ink is very thick and has to be put up in cans with a putty knife; and when in can, its surface should be covered with a circular disk of Paraffine Paper, which prevents any possible oxidation from taking place in the can.

-:-:-:-:-:-:-:-:-:-

1861.

SPECIAL BLACK INK

FOR FINE CARD, CUT AND INVITATION ENGRAVING.

F O R M U L A :

LINSEED OIL VARNISH NO. 3 ..	10 gals.
SOAPSTONE FINELY POWDERED ..	15 lbs.
HYDRO CARBON BLACK	35 "
PRUSSIAN BLUE	1 "

INSTRUCTIONS:

Same methods and instructions for grinding. This kind of Ink, well made, commands a good price and especial care should be exercised in repeating three times the grinding through a water cooler mill working very tight.

-:-:-:-:-:-:-:-:-

BLUE BLACK PRINTERS' INK.

F O R M U L A :

VARNISH OIL NO. 3	10 gals.
FINELY POWDERED PRUSSIAN BLUE	5 lbs.
DEEP ULTRAMARINE BLUE	10 "
FRANKFORT IVORY BLACK	35 "
SOAPSTONE	10 "

INSTRUCTIONS:

Three repeated grindings are necessary for this special ink, which must be exceedingly fine. There is a very large application for it in all classes of printing; also for fancy label as a background. The color can be made more bluish or blacker by simply modifying the proportions of Black and Blue to suit.

-:-:-:-:-:-:-:-:-:-

1864.

[illegible] USED PRINTING INK.

REVIEW.

It is utterly impossible to produce a perfect Bronze Blue from the use of Prussian Blue, Chinese Blue, Berlin or Steel Blue, all those pigments having a texture so fine that even after being ground in Varnish Oil to the consistency of a stiff paste, they are unfit for fine printing work.

In the first place, the maximum amount of Bronzing cannot be expected from these pigments; furthermore, in very fine work or in electrotype cuts, the lines are filled with color. A good sharp print is thus impossible to obtain.

There is only one kind of Cyanide Blue which can produce the beautiful Blue Bronze so extensively used nowadays in Printers' and Lithographers' work. This blue is sold under different fancy names, such as Varnish Blue, Metal Blue or simply English Bronze Blue. It is obtained like the other kinds of Blues above named, by oxidizing a precipitate of Ferrocyanide of Potassium to the highest possible degree. The whole secret of an exceedingly bright and very rich Bronze rests entirely upon the use of Nitrous Acid for oxidizing, instead of using Bi-Chromate, Aqua Fortis, Chloride of Lime or Nitric Acid as oxidizing agents.

F O R M U L A :

FINELY POWDERED ENGLISH BRONZE BLUE... 40 lbs.

VARNISH OIL NO. 2 (see Formula) ..... 2 gals.

INSTRUCTIONS:

No Soapstone should be used; the mixing must be done very carefully and the resulting paste should be sent to the mill three times consecutively.

-:-:-:-:-:-:-:-:-

1864.

CARMINE PRINTING INK.

FORMULA:

VARNISH OIL NO. 1 ..... 1 gal.

CARMINE NO. 40 LACARAT .... 5 lbs.

INSTRUCTIONS:

Mix in a Poney Mixer until the Carmine has absorbed the Varnish Oil; then grind three times, put it up in cans, and cover with a disc of Paraffine Paper before soldering.

-:-:-:-:-:-:-:-:-

1865.

DARK PRINTING INK.

FORMULA:

VARNISH OIL NO. 2.....	1 gal.
RAW SIENNA	5 lbs.
ORANGE CHROME YELLOW	2 lbs.
SOAPSTONE	2 lbs.

INSTRUCTIONS:

Use only washed Sienna, and if the result is too thin, stiffen with more powdered Soapstone.

-:-:-:-:-:-:-:-:-:-

1866.

PRIMROSE YELLOW PRINTING INK.

FORMULA:

BASIC PRIMROSE CHROME YELLOW..	50 lbs.
VARNISH OIL NO. I.	5 gals.
SOAPSTONE	5 lbs.

INSTRUCTIONS:

Use nothing but a Basic Primrose Yellow, as all other kinds will produce an ink that will fill entirely the lines of a fine electrotype cut.

Should be made very stiff, almost solid. If, after grinding, it is not of the consistency of heavy paste, almost dry, stiffen with a little more Soapstone and grind again through water cooled mill.

-:-:-:-:-:-:-:-:-:-

1367.

LEATHER COLOR PRINTING INK.

FORMULA:

BURNT SIENNA	15 lbs.
LAMP BLACK	1/2 lb.
SOAPSTONE	6 lbs.
VARNISH OIL NO. 3	2 gals.

-:-:-:-:-:-:-:-:-:-

1368.

CHROME GREEN PRINTING INKS, LL, L, M, D, DD.

REMARKS:

The Chrome Green Printing Inks, commercially known (according to their shade) under the names Double Light or LL; Light or L; Medium oor M; Deep or D, and Double Deep or DD, are simply the result of mixing together a Canary Shade of Chrome Yellow with a Chinese, Prussian or Bronze Blue.

Ready made Chrome Green in all shades may be advisable for painting purposes, but not for printing Ink making; and it is better to keep in stock the two elements, Yellow and Blue, and by mixing them at any time, get almost any shade of green that may be needed.

LL DOUBLE LIGHT CHROME GREEN PRINTING INK.

FORMULA:

BASIC PRIMROSE YELLOW	25 lbs.
BRONZE BLUE	1 "
SOAPSTONE	5 "
VARNISH OIL NO. 2	2 1/2 gals.

"L" LIGHT CHROME GREEN PRINTING INK.

F O R M U L A :

BASIC PRIMROSE YELLOW	25 lbs.
BRONZE BLUE	2 "
SOAPSTONE	8 "
VARNISH OIL NO. 2	3 "

"M" MEDIUM CHROME GREEN PRINTING INK.

FORMULA:

BASIC PRIMROSE YELLOW	25 lbs.
BRONZE BLUE	4 lbs.
SOAPSTONE	6 "
VARNISH OIL NO. 2	3 gals.

"D" DEEP CHROME GREEN PRINTING INK.

FORMULA:

BASIC PRIMROSE YELLOW	25 lbs.
BRONZE BLUE	6 "
SOAPSTONE	6 "
VARNISH OIL NO. 2.	3 gals.

"DD" DOUBLE DEEP CHROME GREEN PRINTING INK.

FORMULA:

BASIC PRIMROSE YELLOW	25 lbs.
BRONZE BLUE	10 "
SOAPSTONE	10 "
VARNISH OIL NO. 3.....	3 1/2 gals.

1069.

B A N K O F E N G L A N D

and

BANK NOTE PRINTERS' INK (GREEN).

-:-:-:-:-:-:-:-:-:-

The following formula is the genuine one adopted for making a beautiful Chrome Green Lithographers' Ink that was awarded the exclusive contract with the Bank of England during the year 1889.

F O R M U L A :

BASIC PRIMROSE CHROME YELLOW	10 lbs.
BRONZE BLUE	5 "
WHITE ZINC	3 "
SOAPSTONE	1 "
VARNISH OIL NO. I.....	1 1/2 gals.

-:-:-:-:-:-:-:-:-

2991

LEMON YELLOW PRINTING INK.

FORMULA:

BASIC LEMON YELLOW	15 lbs.
SOAPSTONE	1 "
VARNISH OIL NO. I	1 gal.

GOLDEN GROUND PRINTING INK.

FORMULA:

MEDIUM CHROME YELLOW	10 lbs.
LEMON CHROME YELLOW	4 lbs.
SOAPSTONE	3 "
VARNISH OIL NO. I	1 gal.

-:-:-:-:-:-:-:-

GRAY BLUE PRINTING INK.

FORMULA:

ULTRAMARINE BLUE	10 lbs.
PRUSSIAN BLUE	5 lbs.
WHITE ZINC	10 "
SOAPSTONE	5 lbs.
VARNISH OIL NO. I.	2 1/2 gals.

-:-:-:-:-:-:-:-:-:-:-

ROSINE RED PRINTERS' INK.

FORMULA:

ROSINE VARNISH	10 lbs.
SOAPSTONE	5 lbs.
VARNISH OIL NO. I.	1 gal.

10%.

HALF TONE OR PHOTO BROWN.

FORMULA:

CARBINE	1 lb.
ROSE PINK	1 "
SOAPSTONE	5 "
LAMP BLACK	1 oz.
VARNISH OIL NO. I.....	1 qt.

-:-:-:-:-:-:-:-

GRASS AND FOLIAGE GREEN.

FORMULA:

PRIMROSE YELLOW	10 lbs.
BRONZE BLUE	1/2 "
ULTRAMARINE BLUE	1/2 "
MEDIUM SHADE YELLOW	1 "

-:-:-:-:-:-:-:-

NEUTRAL PURPLE PRINT & INK.

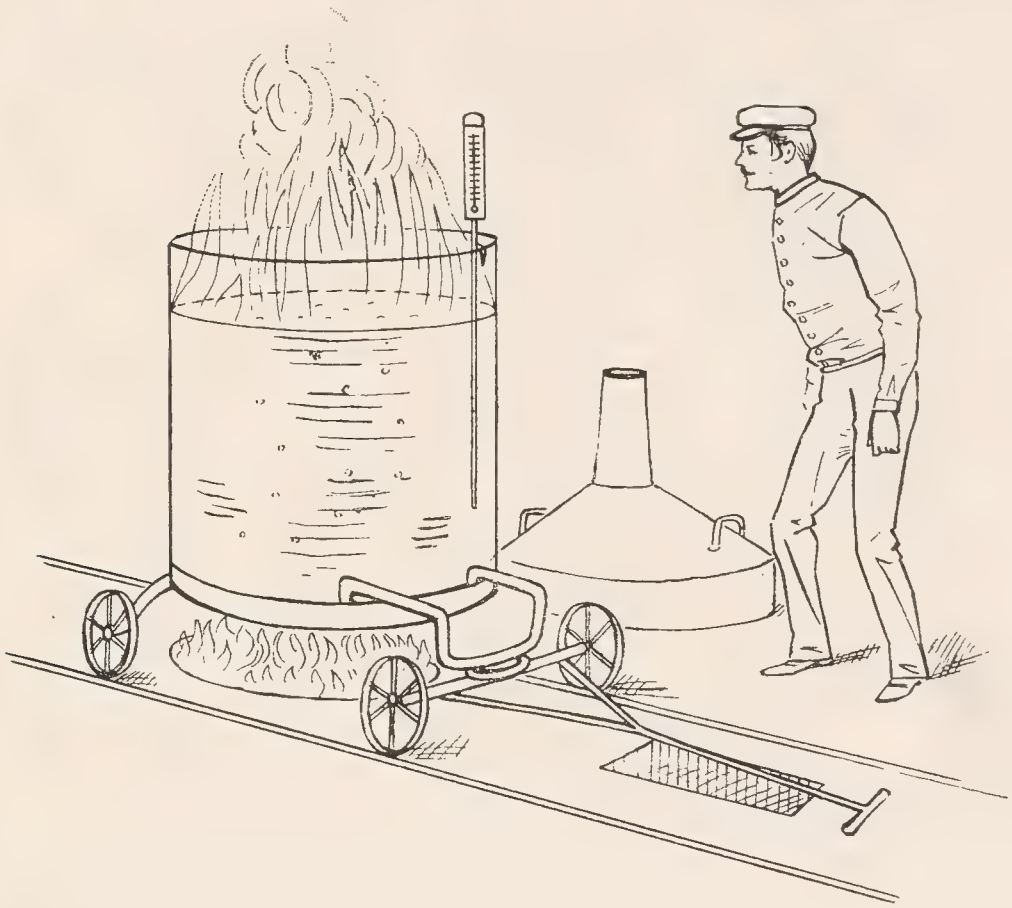
FORMULA:

VIOLET ANILINE LAKE	10 lbs
ULTRAMARINE BLUE	1 "
SOAPSTONE	3 "
VARNISH OIL NO. I.....	1 1/2 gal.

L I N S E E D O I L B U R N I N G P R O C E S S

BY

THE MANUFACTURE OF PRINTERS' AND LITHOGRAPHERS' VARNISHES.



Amongst the various [illegible] oils that are [illegible] suitable for the [illegible] [illegible] tion of fatty acids, [illegible] substances, which are present to a [illegible] or less extent in Linseed Oil, and in a proportion which greatly depends upon the process adopted in extracting the Oil from the Flax-seed. LINSEED OIL BURNING PROCESS has been the subject of a deep study from chemist experts in the treatment of Oils and prominent manufacturers in France, England, and Germany of such Varnish Oils as are needed for the manufacture of Printers' and Lithographers' Varnishes.

CALCUTTA LINSEED OIL is undoubtedly very valuable for making Printers' and Lithographers' Varnishes. BALTIC OIL, which is used in England, is also very desirable; both the CALCUTTA and the BALTIC possess about the maximum degree of affinity for oxygen.

As to AMERICAN LINSEED OIL made from western Flax-seed, it is far from having the same affinity for oxygen as the CALCUTTA or the BALTIC OIL. Furthermore, as it has been said already, AMERICAN LINSEED OIL made from western Flax-seed, calls from the four constitutive elements named in the formula of Linseed Oil:

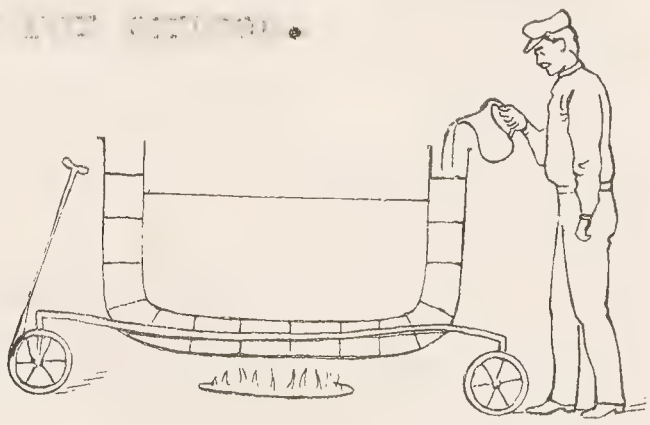
1st. LINOLEIC ACID

2nd. LINOLENIC ACID

3rd. TETROLIC ACID

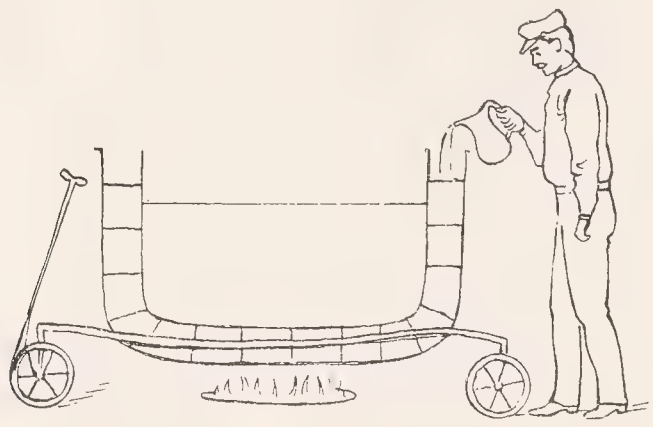
4th. ISONIC ACID

contains even in cases when the Oil has been made from western Flax-seed of the best quality and by the COLD PROCESS, such proportion of mucilaginous substances and insoluble matters, that in order to render DOMESTIC LINSEED OIL fit for use in the preparation of PAINTERS PRINTERS' or LITHOGRAPHERS' VARNISH, it is necessary first to submit the Oil to a special treatment with a view of increasing its affinity for oxygen.



This can be done by the use of not a STEAM JACKETED KETTLE but a DOUBLE KETTLE already described in Vol. I, Part No. II, and special oxidising compounds such as OXIDE OF LEAD or MANGANESE, as

per process and formula given in Vol. II, Part No. I. It is furthermore necessary, in order to render AMERICAN LINSEED OIL fit for use in the preparation of Printers' and Lithographers' Varnish Oils, to eliminate all the causes which would contribute directly or in-

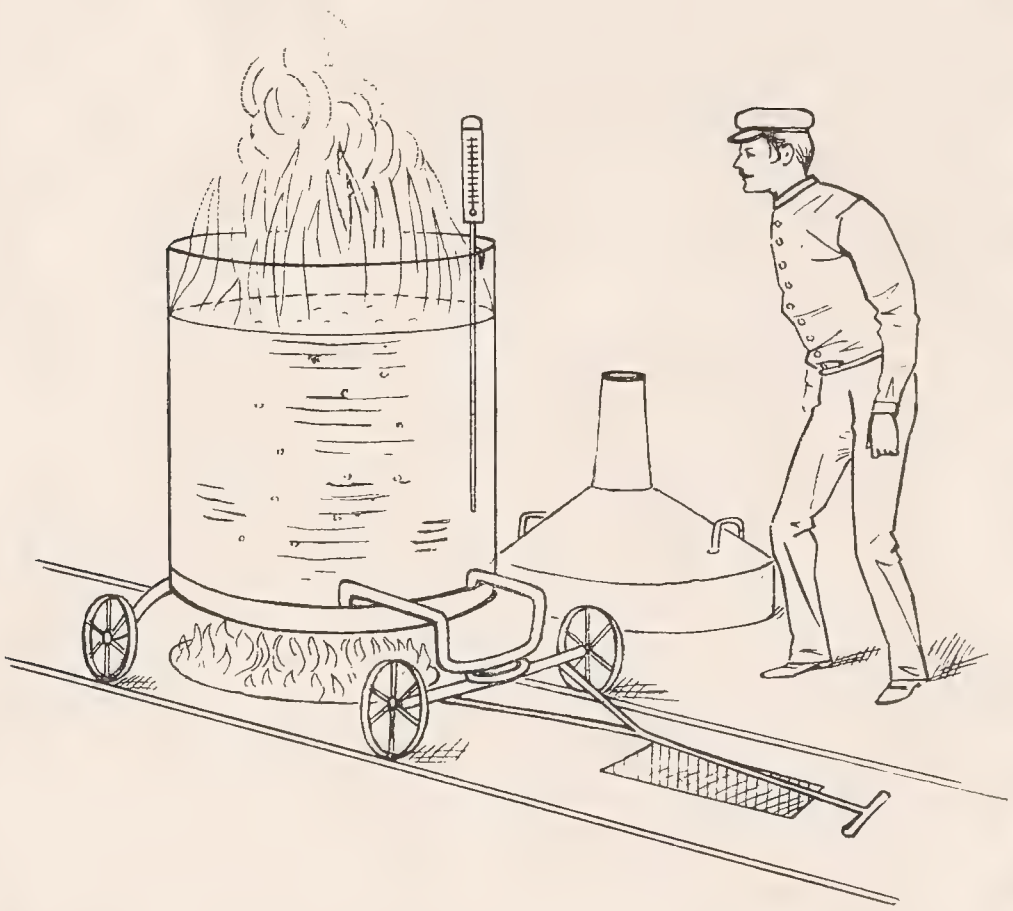


directly to make or render it refractory to the action of heat, or what is commonly termed "BREAK" in the kettle.

Were it not for the comparatively high price of Calcutta Linseed Oil, there would certainly be no advantage in using AMERICAN LINSEED OIL in the preparation of Lithographers' Varnishes. But the price of good Lithographers' Oils or Varnishes have been reduced by a keen competition to so low a figure that the difference between the cost price of AMERICAN and CALCUTTA LINSEED OILS is often more than the profit which a large manufacturer can expect to realize on round lots.

If there is a field of study in the treatment of AMERICAN OIL, it is certainly the adaptation of AMERICAN LINSEED OIL to the same uses as either CALCUTTA or AMERICAN LINSEED OIL; and especially to the preparation of PRINTERS and LITHOGRAPHERS' VARNISHES.

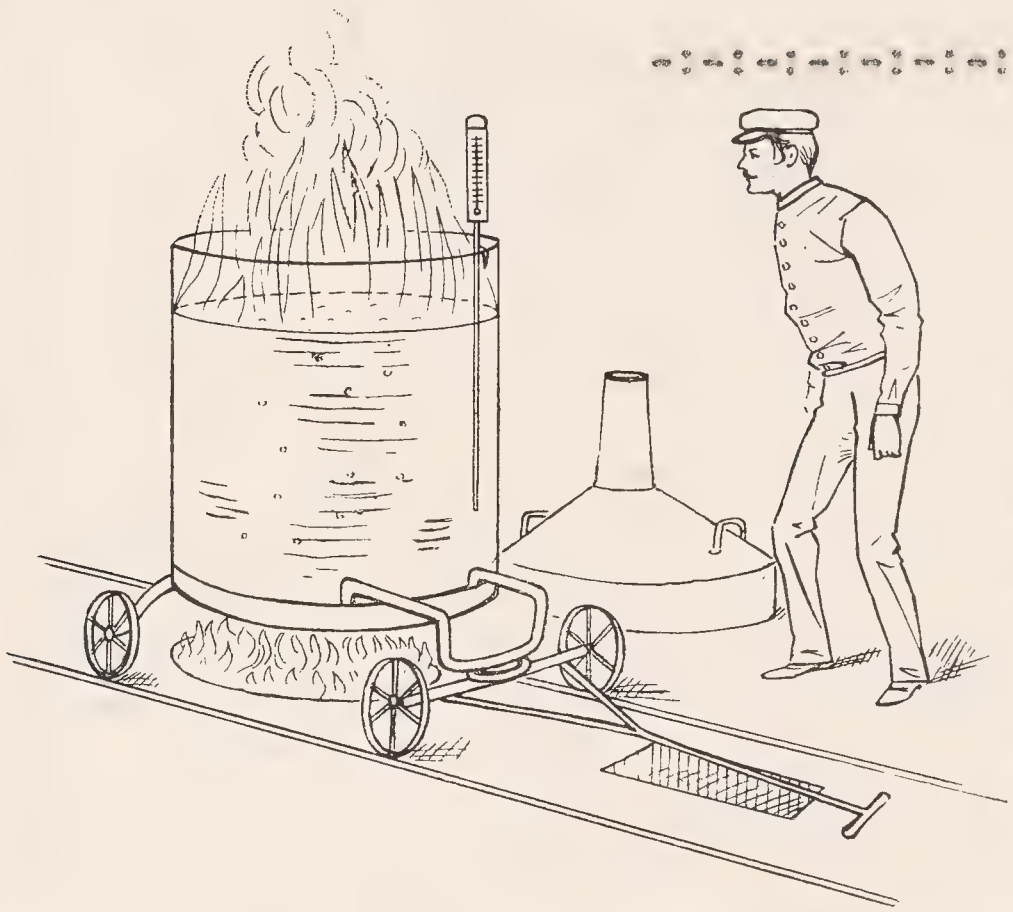
The LIQUID OIL VARNISH PROCESS can be conducted in the ordinary jacketed copper kettle, with direct fire underneath; in the double bottom French varnish kettle indirectly heated by the melted metal heating method; or in the ordinary stationary kettles, such as [illegible] generally adopted for boiling Linseed Oil in large quantities.



In each case of these cases, the use of a [illegible] Thermometer is required, especially when the ordinary Varnish Copper Kettle is used, for the reasons at length explained in Part No. I of Vol. I, "THE SCIENCE OF VARNISH MAKING" (See quotations of Temperature).

When the largest stationary kettle is used, the temperature of the preparation has to be conducted carefully, according to the instructions given; and therefore the use of a good Varnish Thermometer is also advisable.

When the French double-bottom copper kettle is used in combination with the melted metal heating process or any other source of indirect heat, the thermometer is not always necessary.



degree of consistency about twice that it was at the beginning of the operation, which can be ascertained by allowing a drop of it to run on a piece of window glass previously dipped into a pail of water.

[illegible] Filtration is the next and a very important part of the process, which must be conducted with a great deal of care and at the proper moment.

Instead of using [illegible], [illegible], [illegible] or other [illegible] salt [illegible] in [illegible], it is far better to use [illegible] [illegible] [illegible] and such as [illegible] or [illegible] in small proportions.

[illegible] there is left, the next thing to be done is to [illegible] it to cool down to 200 deg. F.

[illegible] 200 deg. F., bring your kettle on fire again; add [illegible] to 250 deg., and as soon as you can [illegible] temperature, the proper moment has come to add the [illegible].

P R O P O R T I O N O F [illegible] D R I E R S

required for oxidizing Linseed Oil

through the Lucidol Process.

-:-:-:-:-:-:-:-

[illegible] or producing

[illegible] oxidation of Linseed Oil, together with

a [illegible]

without affecting

the [illegible] zinc salt of

the linseed pro-

duct, the least

proportion of

[illegible] to use

is:

[illegible]

[illegible]

[illegible]

[illegible] Clear and put fire tly in

[illegible] as soon as

[illegible] but hold a pound

[illegible] and [illegible] point not ...../

to be added [illegible] the crystals have been taken up by the Oil and the froth subsided so as to avoid boiling over. When all the Manganese Oleate has been added, the Lead Oleate is then put in exactly in the same manner, watching closely the temperature of the preparation which is on the fire, so as to avoid heating above 400 deg., until all the Lead Oleate has been put in.

When the Manganese Oleate and Lead Oleate have been taken up by the Oil, the preparation should be heated up again and cooled gradually until it reaches the temperature of 300 deg. At this moment bring up the heat rapidly to the BOILING POINT and put the OIL in ignition in contact with a lighted match over the surface. Let the Oil burn for five to ten minutes longer; then place the cover on the kettle.

The preparation is then practically completed and should be removed from the fire-place for this time long to be consistency required, or cooling down without stirring and stop as it is.

V A R I O U S M E T H O D S O F B U R N I N G

LINSEED OIL

F O R P R I N T I N G I N K P U R P O S E S.

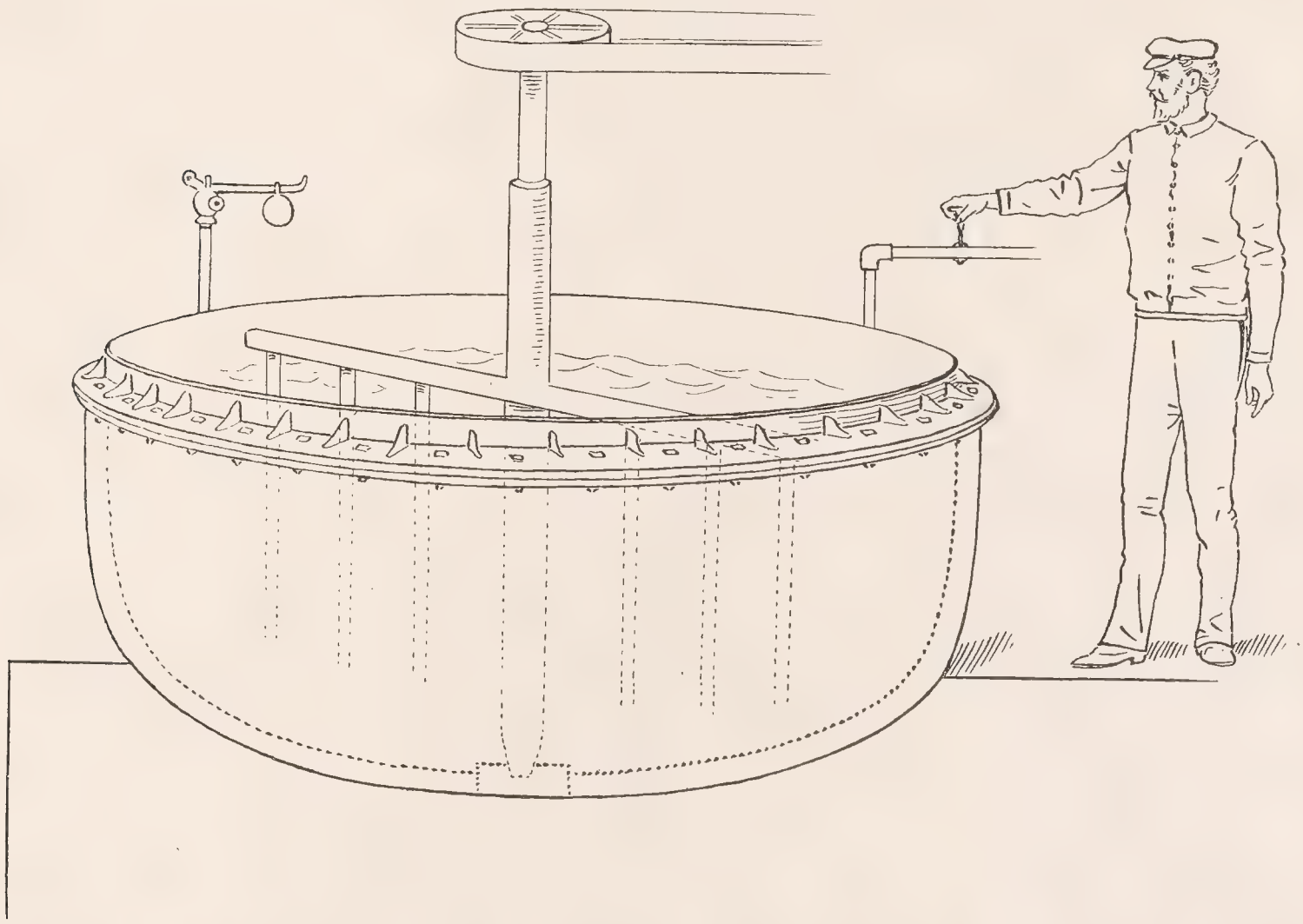
-:-:-:-:-:-:-:-:-

The continued application of Direct Heat to a Kettle containing Linseed Oil heated at a temperature of 620 to 630 deg. F., evolves not only acrid fumes that the operator can hardly stand, but also noxious gases; and should the temperature be raised to 700 deg. F., when the partially destructive distillation has effected the desired change in the thick fluidity, Body and oxidizing of the Oil, this assumes a brownish and sometimes a reddish hue which is far from being desirable in the preparation of fine grades of,Printers' and Lithographers' Ink.

Instead of burning an Oil, when this has reached the FLASH-ING POINT, the operation can be effected by heating the Oil in a Steam Jacketed kettle at a temperature of 500 deg. F.; then allowing it to cool and when at

the ordinary temperature, mixing with it in the proportion of 10 to 15 per cent. in volume a inflammable solvent such as Naphtha.

When the Naphtha has been mixed with the Oil (cold), fire can be set to the mixture by simple contact of a lighted match with the surface. This surface will gradually burn, developing rapidly a very high temperature which would be sufficient for producing an



intense bodying of the Oil without the use of a direct fire underneath the kettle. The operation may be made quicker yet by gradually turning the steam on, which effect would be accelerate the separation by evaporation of the Naphtha, without danger of explosion, providing that the fire be maintained constantly at the surface. This operation should be conducted outside.

IMPORTANT REMARKS CONCERNING THE PRACTICAL MANUFACTURE

of

P R I N T I N G I N K.

-:-:-:-:-:-:-:-

An absolute requirement in the manufacture of Printing Ink is to use for making the Varnish Oil a Raw Linseed Oil from which all mucilage and fatty acids have been thoroughly eliminated. A freshly made Linseed Oil which has not been perfectly purified will produce "Roots" afterwards, and these will cause in the finished product or Printing Ink, an endless amount of troubles, no matter how good may be all the other materials.

Aged Linseed Oil makes a superior printing ink. Fresh Linseed Oil may work well in printing ink for a week or two after the ink has been made, but, especially in colored printing inks made from lakes, when new linseed oil not perfectly free from "Roots" or fatty acids has been used, the Alumina of the Lake will react chemically upon the fatty acids or mucilage of the Varnish Oil, producing some of the drawbacks known as Chickening, Scabbing or Livering Up in cans.

When the contents of a can of Printing Ink have "livered up", the ink becomes absolutely unfit for use and has to be thrown away,

as there is no,possible way of thinning it down with a diluent so as to get the proper consistency again.

In making Printing Inks, it is necessary to take into consideration the fact that some pigments, lakes or dry colors, such as Lamp Black, Ponceau Lake and Aniline Greens, have a peculiar effect upon the varnish oil; they retard the drying considerably; they are, in other words, "slow drying" colors; while there are other pigments, such as Red Lead, Umber, Orange Mineral, Deep Chrome Yellow and White Lead which, on the contrary, are "quick drying" colors. Red Lead, for instance, imparts such a drying property to any Oxidizing Oil, that it cannot be ground in Varnish Oil without adding to it a chemical which will counteract this effect.

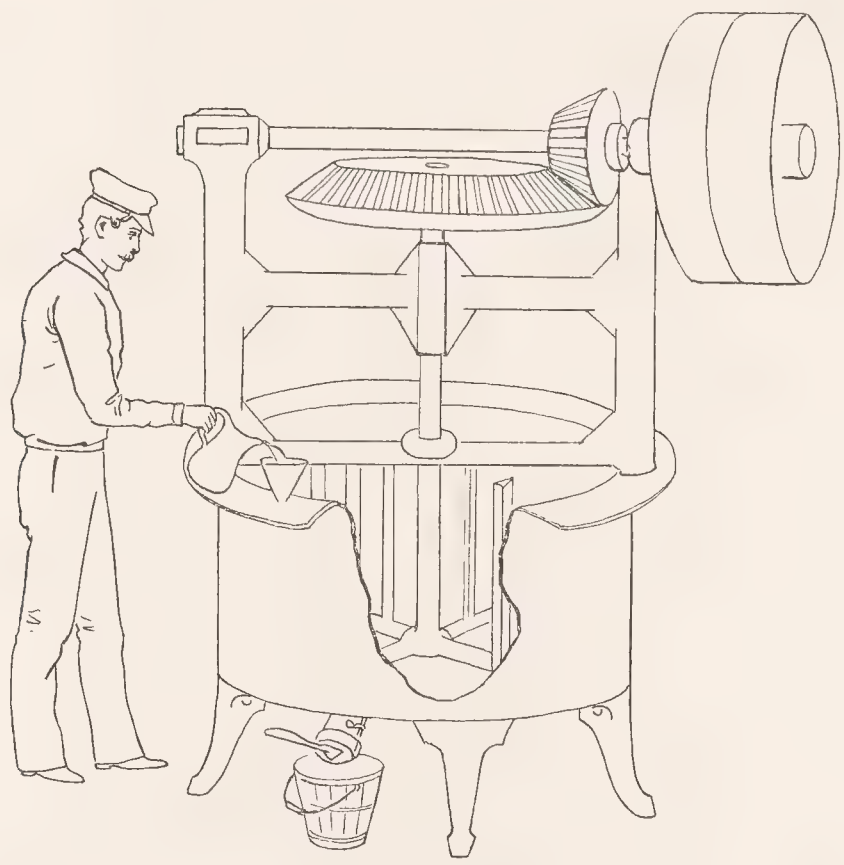
Soapstone has a precious effect in these cases. It prevents to a great extent the hardening; and for this reason a prominent place has been given this material in the formulary of Printing Inks.

Silicate of Alumina or China Clay has also a similar effect; but does not work under the printing press as Soapstone, mostly in very fine electrotype cuts.

When for certain applications in printing or lithographic work, the finished product must necessarily be so thick that it could not run and grind through a horizontal burr-stone water cooler mill,

then the best machinery to use is a mingling or cutting mixer, such as per cut here below.

The dry material is first put in, the mixer coverd and the stirrer put in motion; while at the same time the Varnish Oil or Diluent, whatever it may be, is gradually added, a little at a time, to the dry pigment until the proper consistency of a very stiff paste has been insured. In case that from the nature of the pigment, a paste thick enough can be obtained, then Soapstone should



be used for stiffening to the consistency required.

When the degree of thickness of a printing ink paste is to be such that it will not run from the burr-stonemill, or from a hopper, then the Varnish Oil can only be incorporated through the use of an edge Runner or a Chaser.

In this case a great deal of care should always be exercised in increasing the proportions of Soapstone so as to prevent the hardening in can and preserve the homogeneity of the finished product.

The addition of Soapstone is not always sufficient; in cases for example, when a special sort of printing ink has to be made from a quick drying Varnish Oil and a quick drying Pigment such as Umber.

In this case a little Glycerine in the proportion of only 1% or better yet the same proportion of Paraffine Oil, 25 per cent gravity, will counteract better than anything else the violent drying of the ingredients and their chemical reaction in can.

-:-:-:-:-:-:-:-:-

1074.

S I M P L E M E T H O D

FOR

PRESERVING FROM OXIDATION THE CONTENTS OF A TIN CAN FILLED WITH PRINTERS' INK OR LITHOGRAPHERS' INK IN PASTE.

-:-:-:-:-:-:-:-:-

In the largest factory of Paris, not a single pound or pint of printing or lithographic ink in paste form is put up in cans or other packages without being heated at a temperature of 210 deg. F/

The object of this is, first, to facilitate the packing, which under ordinary circumstances is extremely difficult to do, as the paste is often so stiff, especially in cold, winter days, that its consistency is about like that of Castile Soap.

At a temperature of 210 deg., the paste softens considerably without being fluid or deliquescent; and in this state it is put up in cans as easily as butter.

The can is filled to its utmost capacity, and a round disc of Paraffine Paper, fitting exactly, is placed over the surface of the paste. The can is then covered and closed hermotically or soldered.

Another advantage of heating the ink in paste before putting it in can, is to eliminate as much free air as possible, which, if allowed to remain in the can, would cause the ink to oxidize.

However, no matter how carefully a can of Printers' or Lithographers' Ink in paste has been filled, there is always more or less space inside of the can which is occupied by air after the can has been covered up or soldered perfectly air tight.

This small quantity of air would be sufficient to oxidize the contents of the can to a certain extent, which would be much more noticeable should the ink be made of a very quick drying Varnish Oil and a quick drying Pigment.

The only way and the most efficient method to prevent this oxidation from taking place, is to use the disc of Paraffine Paper above mentioned. The Paraffine Paper will ,keep the surface of the paste from contact with air, no matter how much air may have been left in after the soldering was done.

-:-:-:-:-:-:-:-:-

1375.

THE PRINTING INK MAKER

SHOULD ALWAYS BEAR IN MIND THE FOLLOWING PRACTICAL POINTS, WHICH ARE DICTATED EXCLUSIVELY BY EXPERIENCE.

1st. In grinding a color either in Oil or in Varnish Oil, avoid heating by friction; as heat thus produced will spoil entirely the brilliancy of the color.

2nd. Use Burr-stone Mills only for special inks, having to be made of the consistency not harder than butter; in this case use always water cooled mills.

3rd. For stiff paste colored inks, use preferably steel roller mills. A close working of the rollers is desirable, but avoid also heating.

4th. The chaser should be used only for very common black ink or inks requiring no brilliancy of coloration.

5th. Fatty substances or "foots" in linseed oil, prepared oil or varnish oil will kill the bronze of the finest bronze blue.

6th. The fatty substances already named will kill the fire of Aniline Lakes and Eosine Printing Inks.

7th. The quick drying varnish oil, in which a brilliant Lake is finely ground, must be free from fatty acids, mucilage, sediments or "foots". In other words, only aged Varnish Oil should be used, as any kind of lake presents the peculiarity that it livers up in a Varnish Oil from which the above named substances have not been carefully and thoroughly eliminated.

8th. Age is the only and very best improver and purifier of Oil intended for Printing Ink. Mechanical filtering and clarifying may give satisfactory results in Varnishes, but not in Printing Ink making.

9th. A batch of printing ink should not stand over night in a mixer. The quicker a printing ink is made and put up in can, the brighter will be its color and the better its working properties

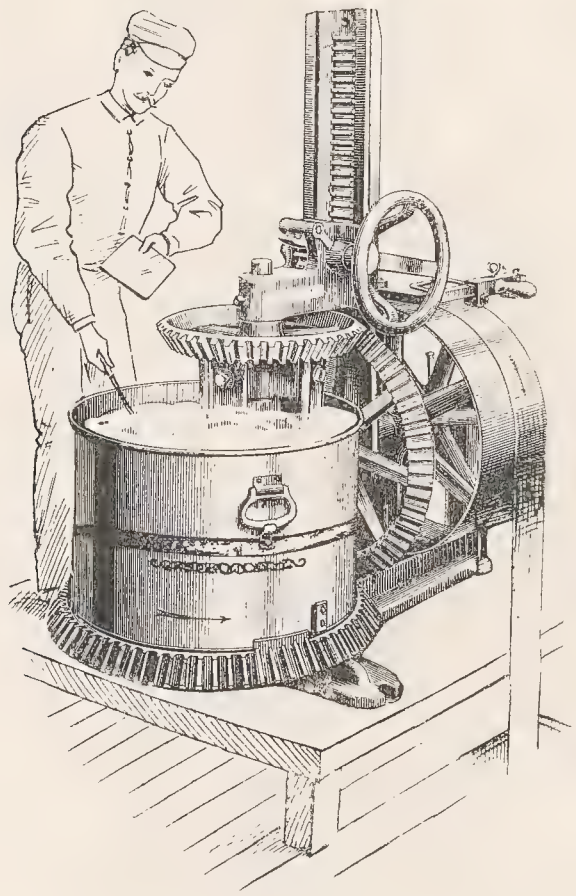
HOW TO MIX AND GRIND PRINTERS' AND LITHOGRAPHERS' COLORS,

so as to make

T H E F I N E S T P R I N T I N G I N K S.

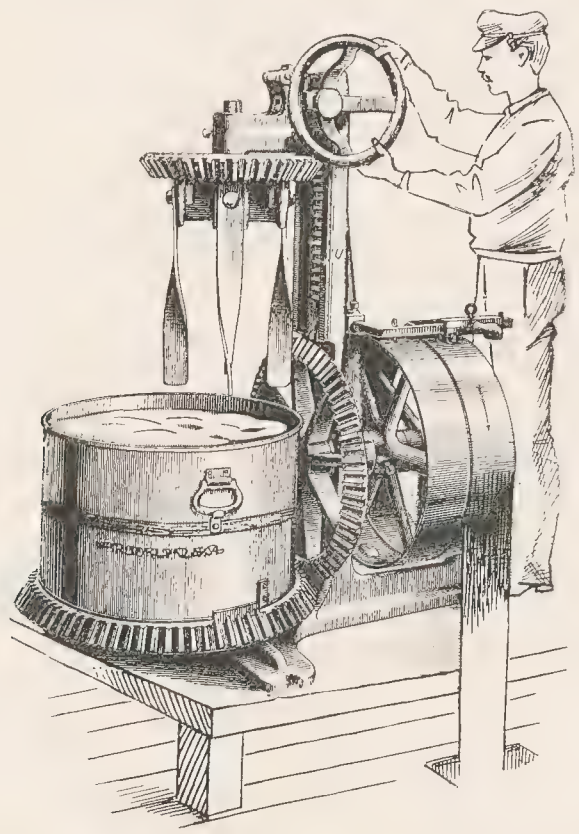
-:-:-:-:-:-:-:-

[illegible] the Varnish Oil, in order to get a strictly Fine-Cut [illegible] Oil, working equally well in Fine



printing and lithographic work, a great deal of care should be exercised in conducting the operation of grinding so as to get the maximum degree of [illegible] division without heating either the Burr-Stone or the Iron Mill. The use of what is commonly named a "WATER COOLED MILL" is not always advisable, especially in grinding the brightest Inks so extensively used nowadays. The first thing to have is a Honey Mixer, such as the one aspar sieve cut.

In a Poney Mixer like this, the first operation, which consists in a disintegration of the lumps, should give as a result, not by any means a paste perfectly homogeneous, but a Varnish Oil and pigment mixture in which the liquid and the solid elements are previously incorporated. A little little more hard Oil, just enough to cover the bottom of the Poney Mixer, should be first put in; then some of the pigment and finally the Oil while the mixer is in motion. (See instructions already given in a previous page of this Chapter).



As soon as the Oil and Pigment mixture is free from lumps, then the preparation is ready for the [illegible] station or grinding on Stone or Iron Mill. According to the degree of fineness desired, several grindings are necessary. The [illegible] ANTICORROSIVE PRIMING PAINT are ground upon the [illegible] mills.

F I R S T G R I N D I N G T H R O U G H I R O N M I L L S .

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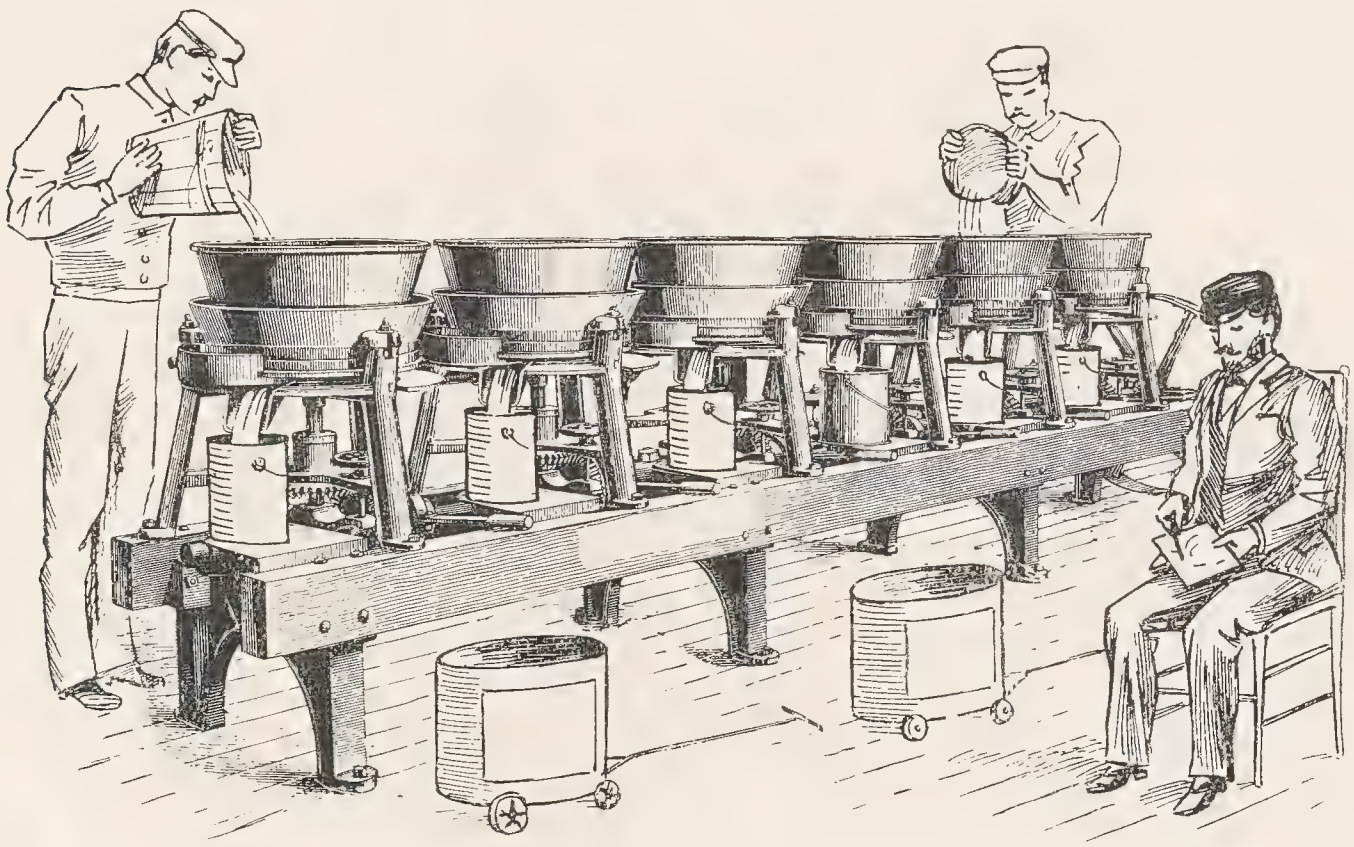
Immediately after the Pigment and the Varnish Oil have been intimately associated together through the Ponsy Mixer to the consistency of a heavy paste, free from lumps, the material is carried over into the hopper of grinding mills, as per cut; and there the

distribution is perfected; and the material is thus gradually prepared for the second grinding, which is a more thorough one and requires the use of finely dressed French Burr-stone Mills. Some manufacturers, although using finer class materials, produce imperfect grinding into oil; so the selective grinding; furthermore, by using a more fluid oil stiffer the paste, the more perfect the grinding will be.

SECOND GRINDING THROUGH BURR-STONE MILLS.

-:-:-:-:-:-:-:-:-

From the Iron Mill, and after the first grinding, the material is now ready for a more thorough disintegration, which is generally accomplished through a French Burr-Stone Mill. At this stage of the process, the liquid and the solid part of the mixture are in-



timately incorporated, but not sufficiently to answer the requirements of the finest press- work; and dosire fed ink, for instance, would fill up lines of the litho-crayon stone or such fine electrotype cuts produced through a photo engraving process.

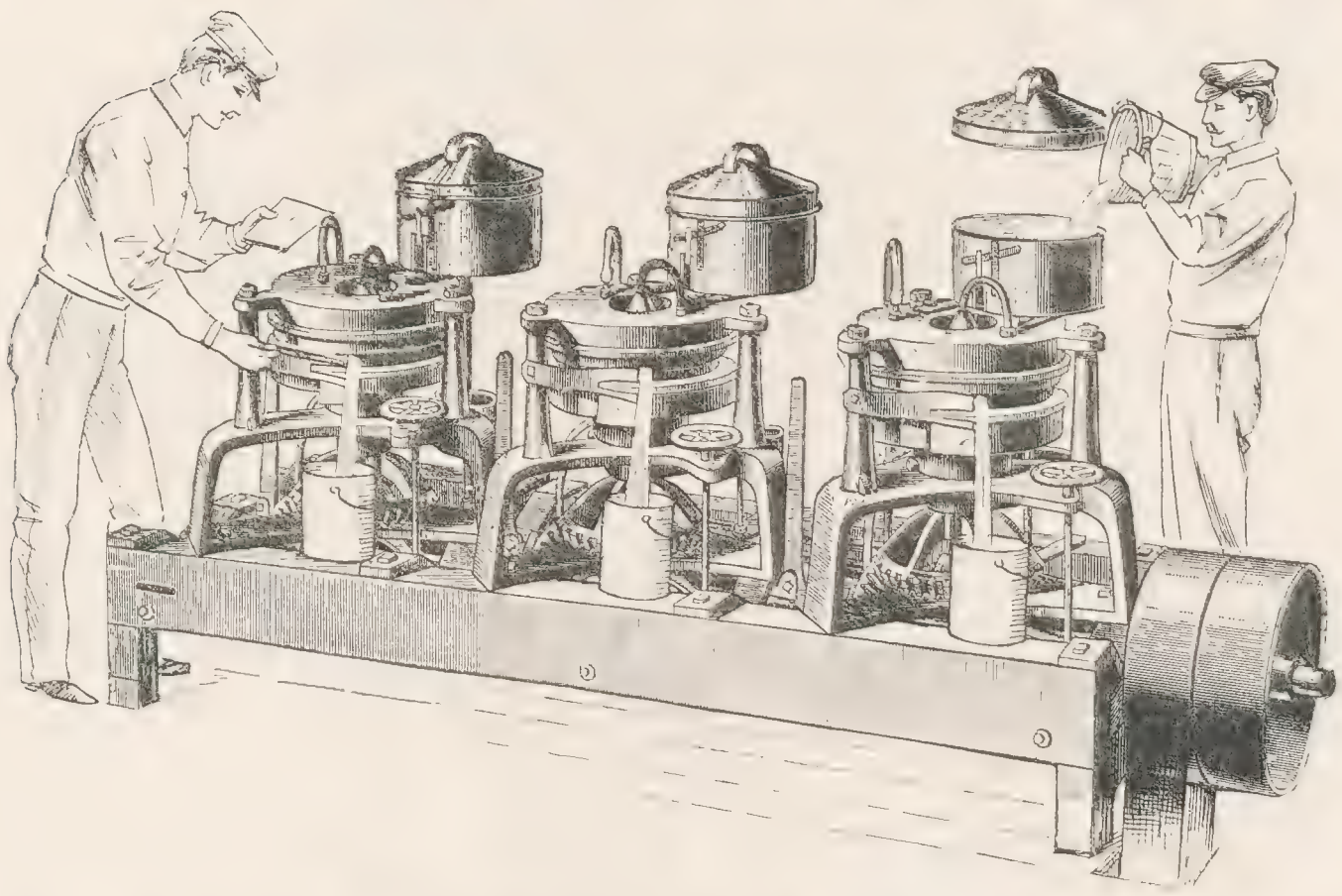
The third and last grinding is consequently necessary.

T H I R D A N D L A S T G R I N D I N G

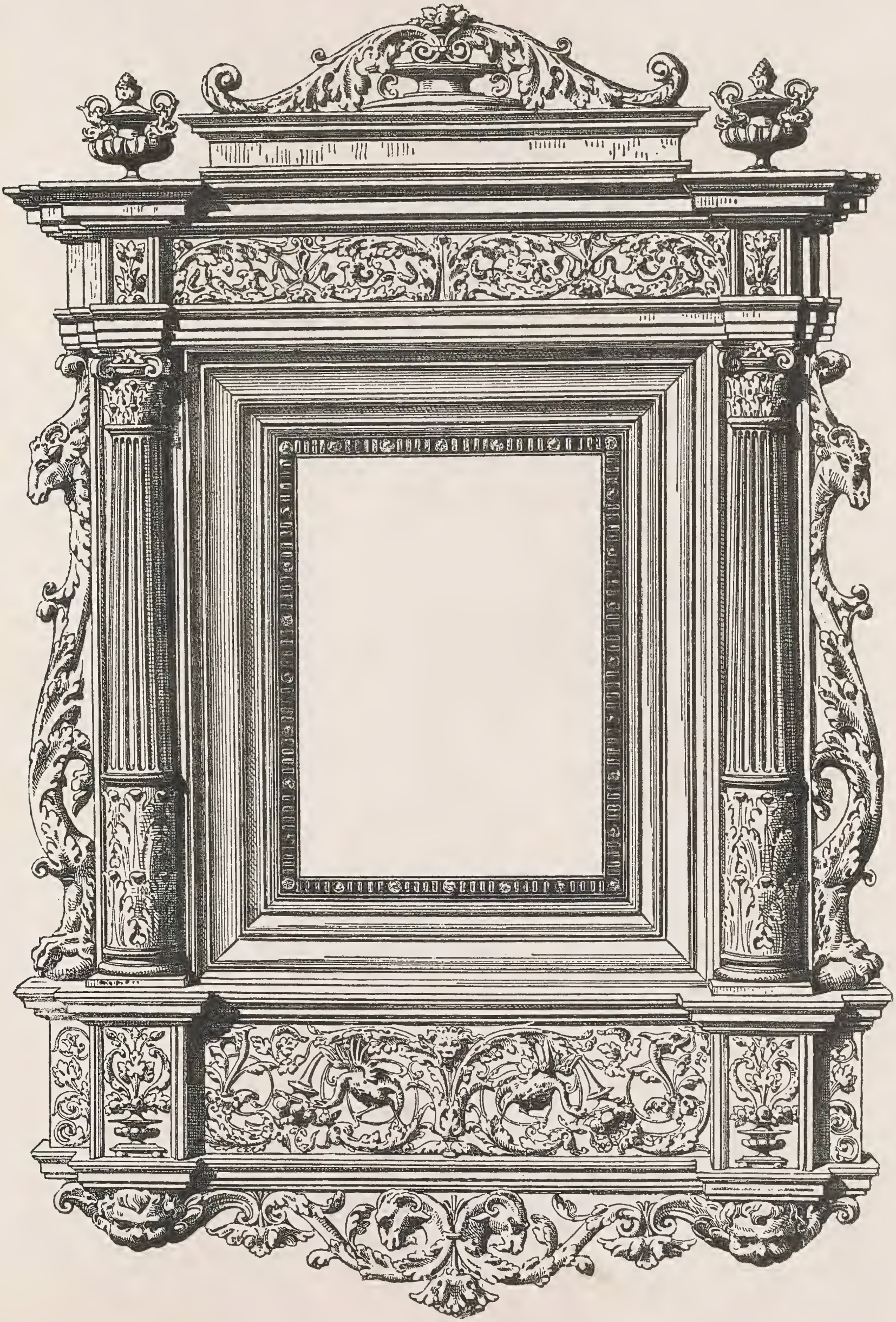
THROUGH THE IMPROVED WATER COOLER FRENCH BUHR-STONE MILL.

-:-:-:-:-:-:-:-:-

It was stated at the commencement, if we remember rightly, that the material in question, or at least some kind of water cooler-mill, as per cut, [illegible], [illegible] it may be, still was usually be-



tween the stones of the mill; and it will be thus possible to do this last grinding well. Stones very close, without danger of over-heating and spoiling the meal which [illegible]. The operation is very practical, [illegible] and the finisher [illegible] meal to the French, providing that the [illegible] an inferior quality, or to often the case.



PART [illegible].

(See Index on the next page).

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SUBJECT-MATTER:

[illegible]

[illegible]

[illegible]

PART NO. XIX.

COMPLETE FORMULARY AND INSTRUCTIONS FOR MANUFACTURING ALL SORTS OF BAKING JAPANS? ASPHALTUM AND BLACK VARNISHES.

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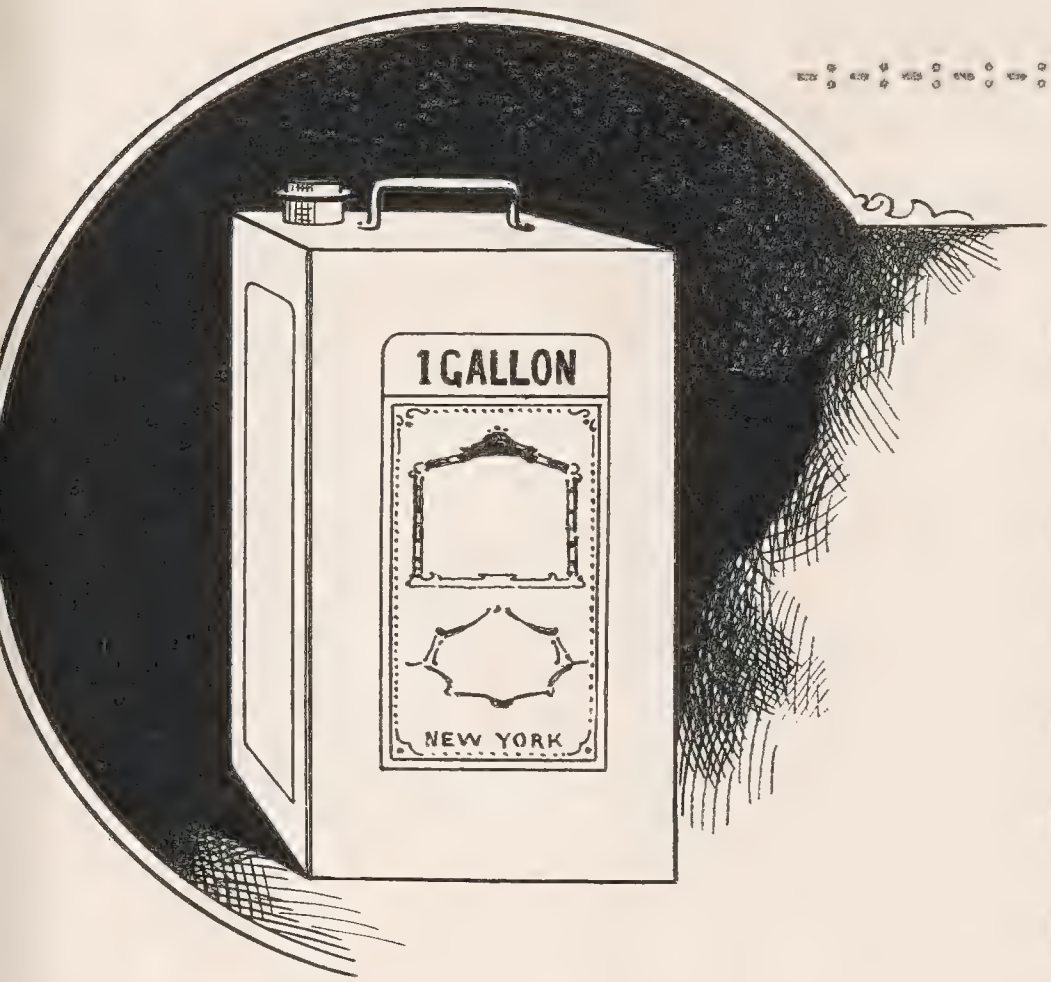
BAKING JAPANS, ASPHALTUM AND BLACK VARNISHES.

-:-:-:-:-:-:-:-



There are a great many applications for all sorts of black varnishes; some of them have to be made from expensive materials such as WELL PREPARED OILS, ARE GUM combined with the best EGYPTIAN or CUBAN ASPHALTUM; others have to be prepared in the most economical manner from the cheapest ingredients or materials.

Ordinary ASPHALTUM VARNISH would be too brittle and too easily affected by heat for use in the preparation of what is named a "BEST JAPAN"; but associated with a hard gum such as CORAL and a certain amount of PREPARED LINSEED OIL, it becomes a very useful product, from which fine work can be obtained.

BLACK VARNISHES are sometimes intended to be used for "dipping", in which case they need be rather thin; when they are intended to be applied like an ordinary japan, with the brush, they must have then the required body, COLOR and other properties.

After being applied on METAL, BUILDING, HARDWARE, UTENSILS, WOOD, PIPES, BOILERS, the varnished surfaces are exposed .....

to the action of a moderate heat; this is what is called "STOVING" or "BAKING". The object of this is to produce a perfect diffusion of the Varnish uniformly all over the surface; and after the surface has been allowed to cool, the result is a "FINISH" so even that the article appears as if it had been enamelled.

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" 1910.

BURNING RAW UMBER FOR USE IN MAKING JAPANS.

Instead of buying Burnt Umber, it is far better to burn or calcine the Raw Umber just before using, when the formula calls for it. In this manner you get all the action of the material as a drier; while otherwise, in buying Burnt Umber from the market, you may get a product having entirely lost its action and in some instances having absorbed the dampness of the air to such an extent that the material gas become unfit for use.

Buy the Raw Turkey Umber, and about half an hour before using it, place it upon a well lighted fire made from coke and free from flame, on a sheet of iron or better, on an iron pan, until perfectly calcined.

The above is considered by Varnish Makers as being a necessary precaution against the possibility of making use of a worthless Umber.

EMERA HEAVY HARDWARE MACHINE JAPAN.

-:-:-:-:-:-:-:-:-

FORMULA:

Yield in Gallons:

9	150 lbs	GILSONITE.
3	50 "	OBSIDIAN.
4	50 "	KAURI DUST.
50	50 gals	RAW LINSEED OIL.
60	60 "	TURPENTINE.
30	30 "	CAMPHORATED NAPHTHA.
155 Gals		

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1930.

BRUSHING SPRING MACHINE MINIE INC JAPAN.

FORMULA:

Yield in Gallons:

12	200 lbs	EGYPTIAN ASPHALTUM.
3	50 "	OBSIDIAN.
3	50 "	KAURI DUST.
6	60 "	ROSIN "X".
60	60 gals	RAW LINSEED OIL.
60	60 "	TURPENTINE.
40	40 "	NAPHTHA.
184 Gallons.		

The addition of OBSIDIAN imparts ELASTICITY.

E X T R A H E A V Y A S P H A L T U M V A R N I S H.

-:-:-:-:-:-:-:-:-

FORMULA:

Yield in Gallons:

9	100 lbs.....		ASPHALTUM.
5	50 "	.....	FRENCH ARTIFICIAL KAURI
7	7 gals.....		NO. II PREPARED OIL.
15	15 "	.....	TURPENTINE.
25	25 "	....	NAPHTHA.
61 Gals.			

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1950.

All the other grades and inferior qualities of Asphaltum Varnish are made from the very same ingredients, varying the proportions according to price.

NO. I ASPHALTUM VARNISH is obtained by using, instead of French Artificial Kauri, common Rosin in the same proportion of 50 lbs, and 3 gals of oil instead of 7.

NO. 2 ASPHALTUM VARNISH is obtained by using equal parts of Asphaltum and Common Rosin without the addition of Oil, and using only Naphtha as a thinner.

The BRITTLENESS of Asphaltum Benzine Varnish is to a great extent counteracted by the use of a little Camphor Gum.

RESULTS OF MY EXPERIMENTS IN MAKING BLACK VARNISHES FROM THE USE OF COAL TAR RESIDUES, DEAD OILS AND ROOFING PITCH.

-:-:-:-:-:-:-:-:-:-

The residue of the distillation of Tar, produced in so large a quantity by Gas Factories, can be had at a very low price and utilized for the production of wood and iron preservatives.

The results of the distillation are in the first place what is called "FIRST RUN LIGHT TAR OIL", of a specific gravity 14-1/2 deg., which can be had in car lot quantities at 15 cents pergallon.

The second product is named "DEAD OIL", and its price ranges from 10 to 12 cents per gallon.

The third and last product is a solid residue named "BLACK TAR PITCH" or commonly "ROOFING PITCH". Its price is only 85 cents per hundred pounds.

The FIRST RUN LIGHT TAR OIL, as well as the DEAD OIL, are energetic solvents of "COAL TAR COLORS" or ANILINE DYES. Consequently, if a small quantity of COAL TAR BLUE is dissolved in any one of the Oils above referred to, a beautiful Oil Stain will be the result, and a magnificant BLUE-BLACK VARNISH can be produced by dissolving in this Blue Colored Oil a small quantity of ROOFING PITCH.

[illegible]

(See Index on the next [illegible]).

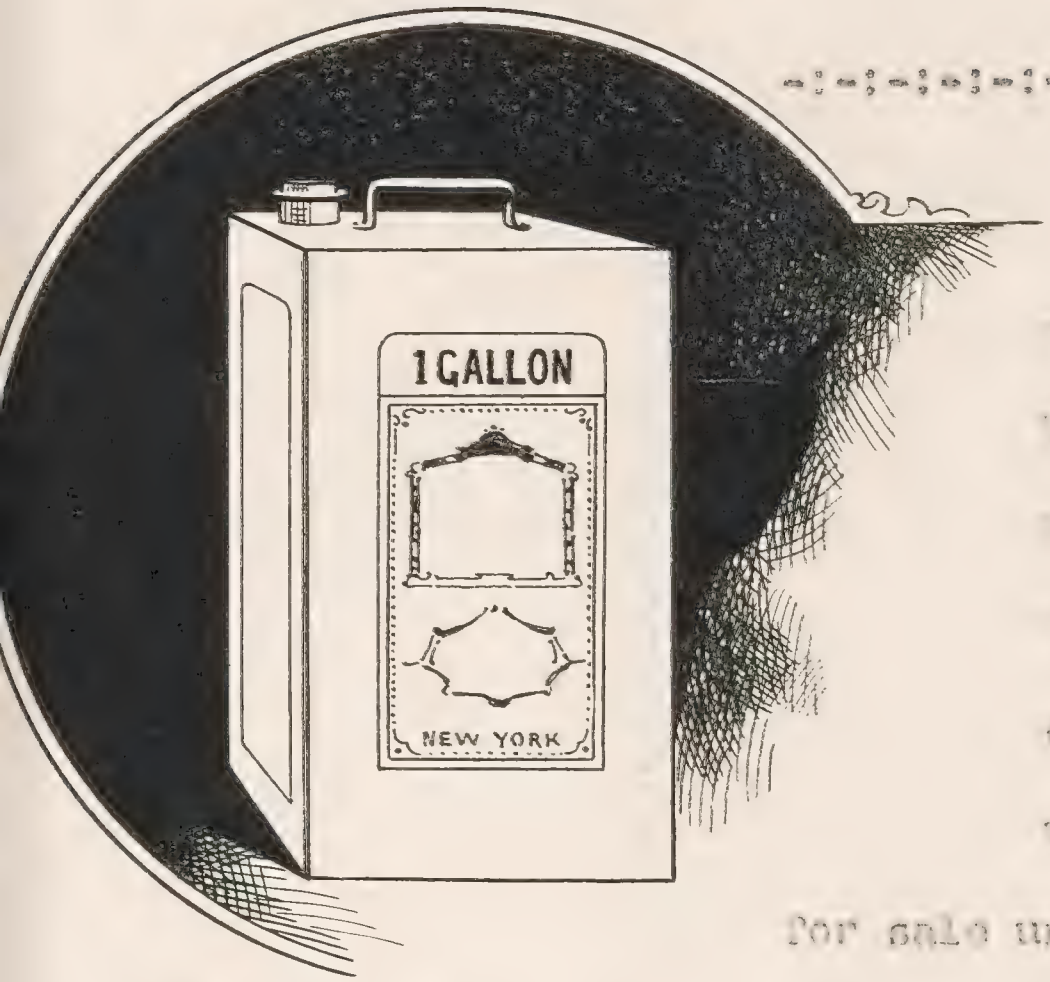
[illegible]

COMPLETE FORMULARY AND INSTRUCTIONS FOR MANUFACTURING ALL SORTS OF V A R N I S H S P E C I A L T I E S .

-:-:-:-:-:-:-:-

V A R N I S H S P E C I A L T I E S .

-:-:-:-:-:-:-:-:-

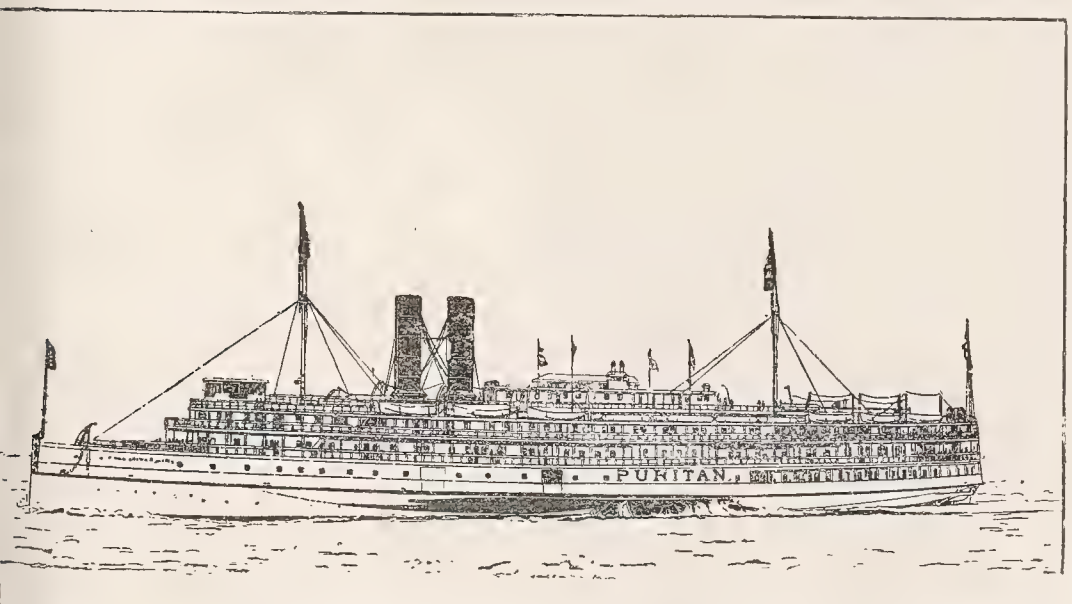


Aside from the general line of standard goods, such as [illegible], [illegible], [illegible], [illegible], etc., or of progressive varnish makers generally a varnish specialty which he places on the market for sale under his trade mark or a proprietary name.

There are specialties in the line of PREPARED OILS, JAPANS, VARNISH COMPOSITIONS, DRIERS, OXIDIZING COMPOUNDS, STAINS and LACQUERS. Some of these have met with great favor amongst jobbers all over the United States; others have met with favor only in certain localities where atmospheric influences have to be counteracted by special compounds presenting certain peculiarities, and therefore are introduced only to local trade.

[illegible] the line of the purpose for which a varnish is formulated and a perfect knowledge of the most manner of [illegible] the varnish and realizing it under the most favorable circumstances, can enable an [illegible] maker to originate a successful varnish specialty.

SPAR COMPOSITION FOR STEAMERS AND YACHTS.



There is quite an amount of varnish used for beautifying the interior of trans-Atlantic steamers and sometimes the exterior of the yachts.

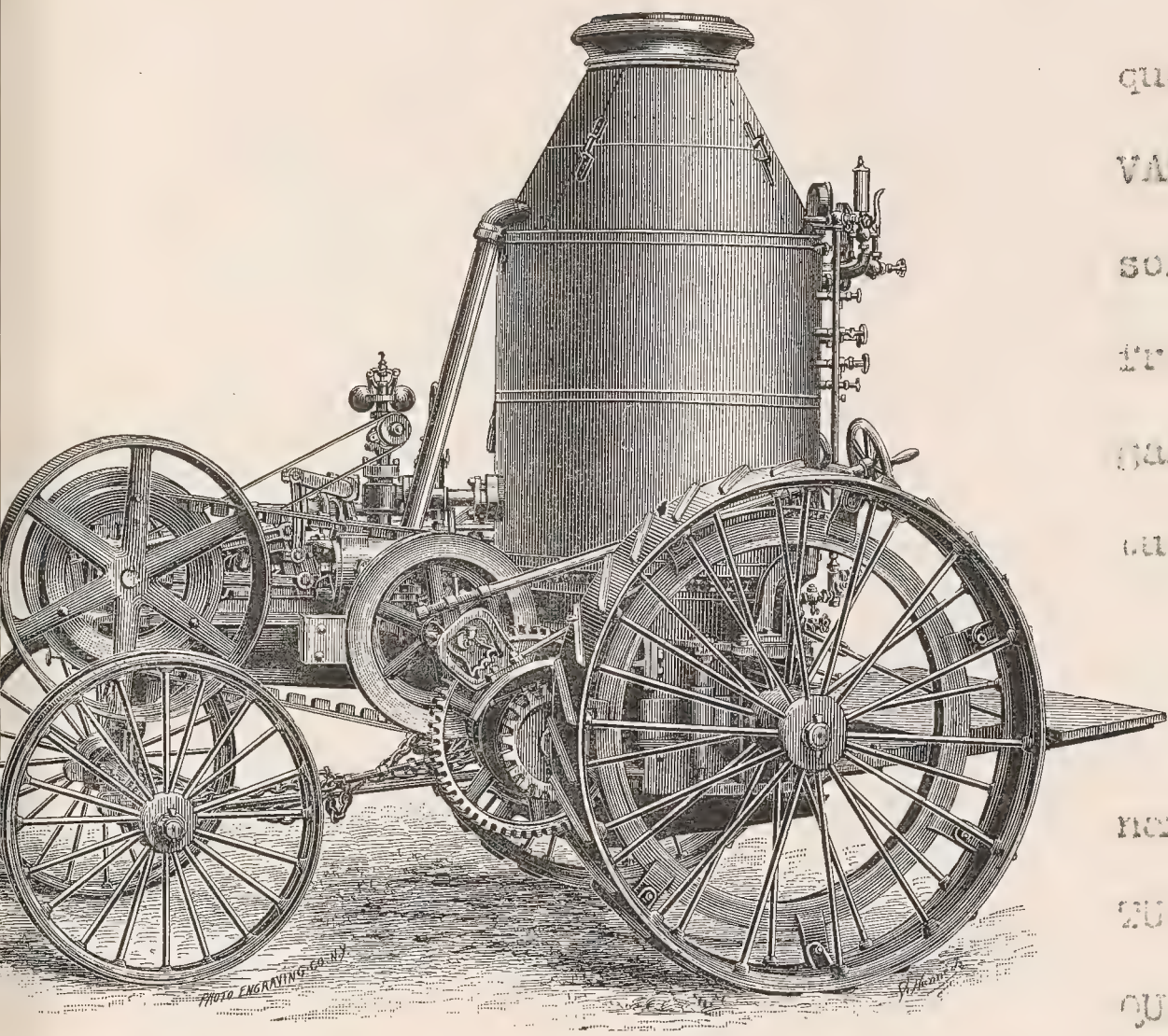
Varnishes made for this purpose must present greater resisting properties than ordinary varnishes, as they have to stand the destructive action of marine salts or marine breezes, rapid changes of temperature, dampness, etc.

Under the name of SPAR COMPOSITIONS, some Varnish specialities intended for the purpose above specified are used extensively today on the Atlantic as well as on the Pacific coast. The formula which I give is one of the best known up to date. The resulting Varnish has a great deal of elasticity, LUSTRE, BRILLIANCY. It resists the action of sea salt and does not mar white.

Yield in Gallons:

6	100 lbs.	NORTH COAST.
5	50 "	FRENCH ARTIFICIAL KAURI,
3	55 "	ST. P. ZANZIBAR.
50	50 gals	NO.5 MANGANESE OLEMARGON
45	47 "	TURPENTINE.
10	10 "	CAMPHORATED NAPHTHA.

S P E C I A L A G R I C U L T U R A L C O A C H V A R N I S H



A considerable quantity of MEDIUM GRADE VARNISH is manufactured and sold at a price ranging from 90 cts. to $1.25 per gal. for use on Agricultural Implements.

This article is placed on the market under the name of SPECIAL AGRICULTURAL COACH. It must be QUICK DRYING, leave a fine GLOSS and be reasonably durable. By varying the proportions of ingredients given in the following formula, the manufacturer can meet competition with almost any grade.

Yield in gallons:

6	100 lbs.	.....	A GAUM.
[illegible]	30 "	.....	PALE AMBER COPAL.
3	3 gals	.....	NO. 1, FURNITURE OIL.
[illegible]	[illegible] "	.....	TURPENTINE
20	20 "	.....	BENZINE.
38 gals.			

CHEAP PARAFFINE BLACK VARNISHES FOR BRIDGES AND IRON STRUCTURES.

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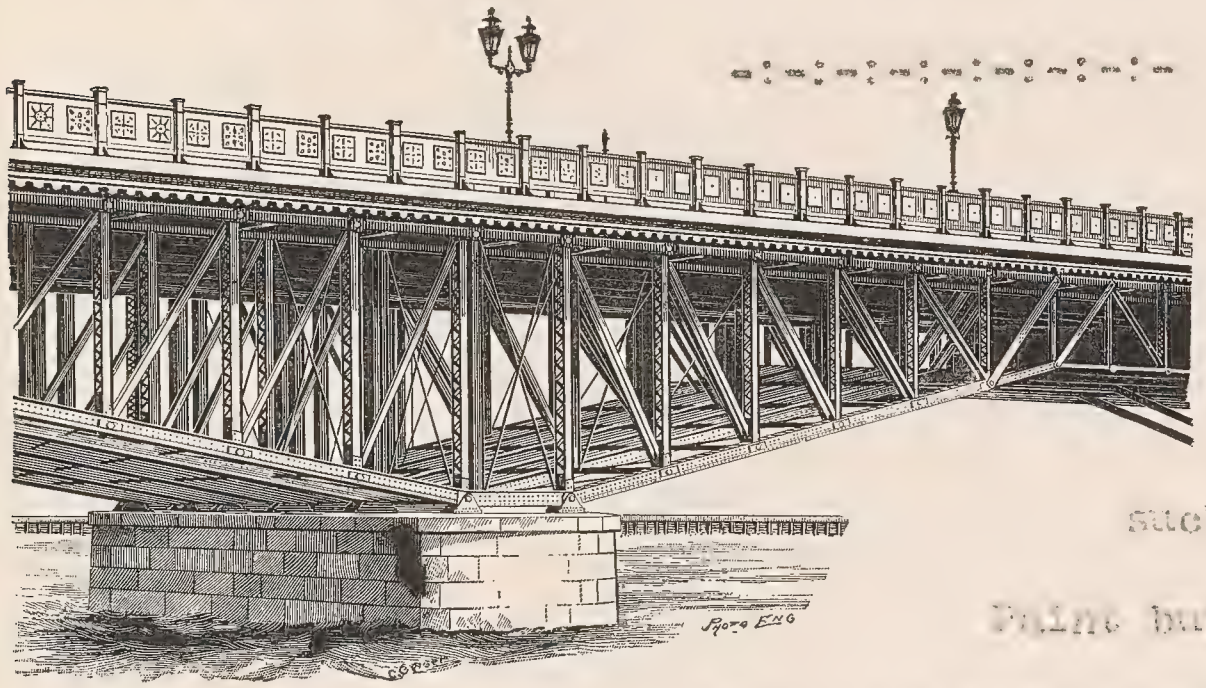


The cheapest preservative coating for large iron structures, such as bridges, is not a Paint but a Black Varnish made from a BITUMINOUS RESIN and a MINERAL OIL.

The use of ASPHALTUM, GILSONITE, or GILSONITE would give satisfactory results providing that some PREPARED OIL be added to them, in which case the result would be a Black Varnish of a comparatively high grade and therefore in many cases too expensive.

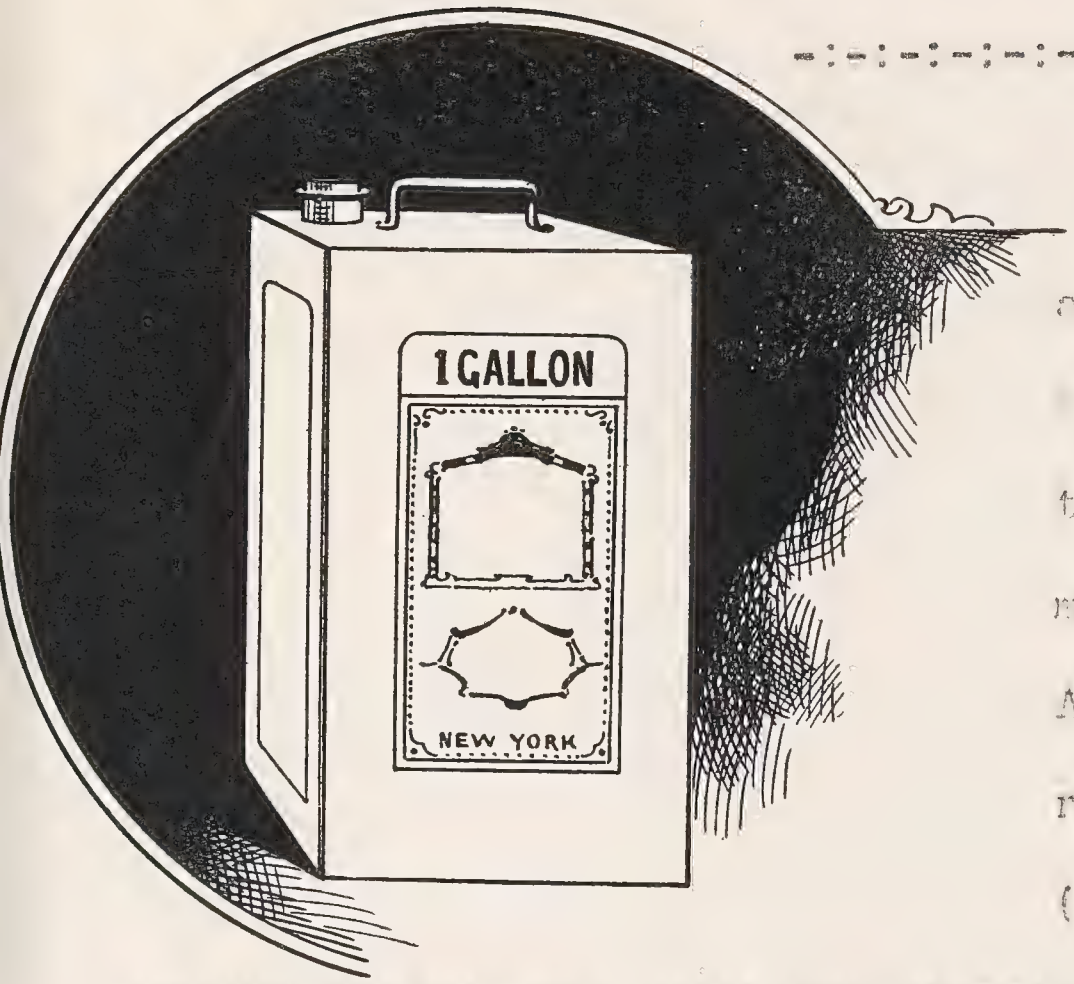
The residue of the distillation of Tar, generally named "ROOFING PITCH", or another similar product recently placed on the market as being a natural product, under the name of "UTAH PITCH", combined with Neutral or Paraffine Oil, or Rosin Oil, will give a very cheap preservative coating for iron.

F O R M U L A :

Melt in a large stationary iron kettle, 2000 lbs of ROOFING PITCH; when melted and perfectly liquefied, stop the fire; then thin down with 100 gals. of NEUTRAL OIL, TAR OIL or ROSIN OIL.

RAILROAD VARNISHES.

-:-:-:-:-:-:-:-:-



Some Varnish manufacturers are making a speciality of Railroad Varnishes. The most extensively used are not by any means of the very highest grade. As a general rule, the Varnishes required by Railroad Companies (with a few exceptions) are MEDIUM GRADES, the question of price being of the first considerations.

A few items worth in demand by Railroad Companies are:

1st. CAR VARNISH.

2nd. LOCOMOTIVE FINISH JAPANS.

3rd. BUILDING POLISHES.

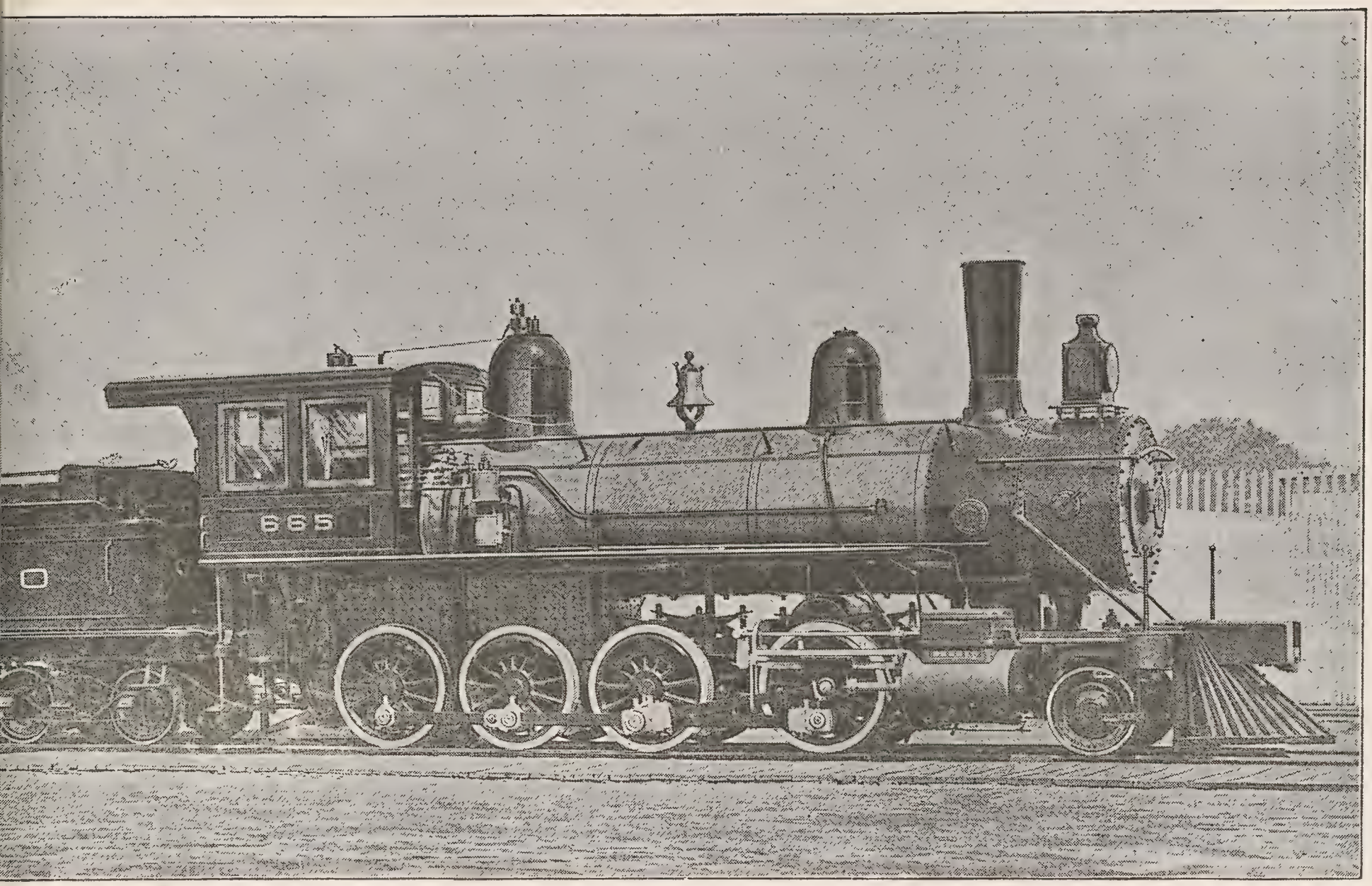
4th. ELASTIC SPAR.

5th. NO. 1 COAT.

6th. QUICK DRYING JAPAN.

According to price, the Germans almost always for rubbing the above goods are very attractive. (Continued).

RAILROAD VARNISHES.



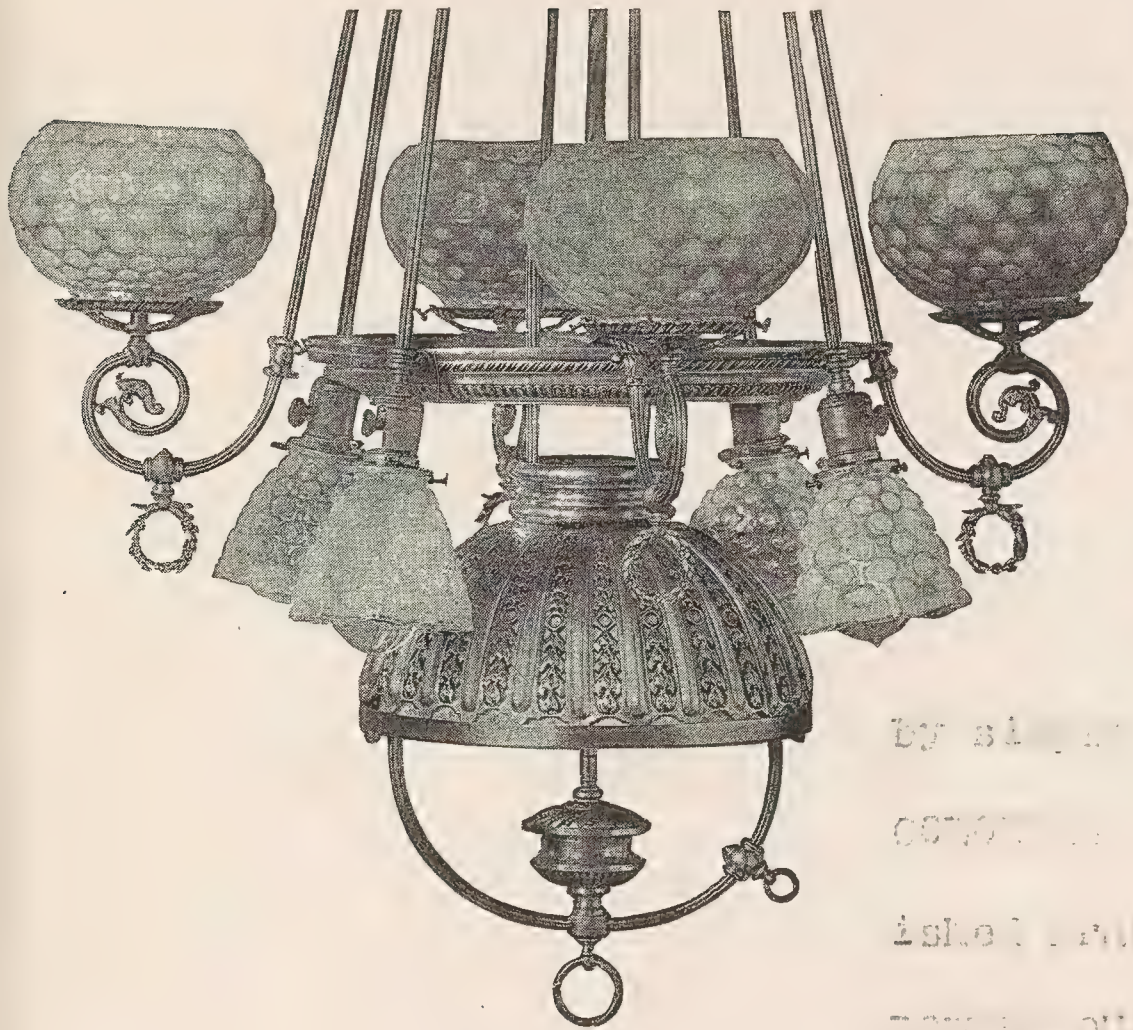
[illegible] FOR [illegible].

Table in Gallons:

9	[illegible]	HILLDITE.
[illegible]	[illegible] "	ORIENTA.
3	[illegible] "	[illegible]
15	1 [illegible]	[illegible]
[illegible]	[illegible] "	[illegible]
50	[illegible] "	[illegible]
100		

Same instructions as given for formula in Chapter XIII.

GOLD LACQUER FOR LAMP FIXTURES.



In order to prevent from oxidation polished metals such as brass so extensively used in electrical appliances and lamp fixtures, these articles are coated with a Lacquer by simple dipping. For white metals COPAL LACQUERS are used; for polished brass or aluminum bronze, METAL LACQUERS are used in preference.

FORMULA FOR THE GOLD LACQUER.

Yield in Gallons:

14	14 gals.	.....	WOOD ALCOHOL.
1	1 "	.....	REFINED WHITE OIL.
3	30 lbs.	.....	SHELLAC GUM (SHELLAC [illegible])
2	20 "	.....	W.W. FRENCH ARTIFICIAL KAURI
	3 gal.	.....	WHITE CAMPHOR OIL.

In Lacquering Brass Chandeliers, a Colorless Lacquer is needed, use the above oil, but omitting the Camphor Oil. LACQUER NO. 1. (See Chapter XIII.)

L I Q U I D S T O V E P O L I S H.

-:-:-:-:-:-:-:-:-

Although the manufacture of a Liquid Stove Polish cannot be considered as a branch of the [illegible] of Varnishes, I include it in this [illegible] of Specialties a formula which is in daily use for the production of a beautiful Stove Polish, in liquid form and placed on the market ready for use. [illegible]

[illegible] or Turpentine is intimately mixed to the consistence of a thick paste with Turpentine, and the mass allowed to rup until the paste is perfectly homogeneous and free from lumps; at this moment the paste is thin and [illegible] with a little PARAFFINE OIL, 23 deg. gravity, to the consistence of a heavy paste; it is then put up in bottles ready for use.

Should a more economical product be desired, benzine may be substituted for Turpentine and the mixture made thinner.

I N T E R I O R F I N I S H.

-:-:-:-:-:-:-:-:-

The numberless preparations of VARNISH or FINISHES placed on the market and sold under the name of "INTERIOR FINISHES", comprise the whole range of FAT VARNISHES, from the highest grade of LIMED BODY ZANZIBAR to the cheapest kind of FURNITURE VARNISHES made from FRENCH ARTIFICIAL KAURI or HARD DRYING SUBSTANCES.

According to the quality of the work to be finished, the Varnisher selects his material, whether the most economical or the most expensive.

The formula for making what is called INTERIOR OIL, is con-

sequently the same as that formula for making Varnish, or a very expensive craft, the quality of the goods being regulated by the price at which they have to be sold.

INTERIOR FINISH is nothing but OAK OIL FINISH, HARDENING BODY ZANZIBAR, TAR COPAL, ETC., FURNITURE, NOTHING EXTRA or HARD VARNISHES as the case may be.

BRONZING LIQUIDS

FOR GILDING GOLD, BRONZE AND SILVER PAINTS.

-:-:-:-:-:-:-:-:-

There is quite a demand for a Paint or Lacquer Paint for application on interior [illegible] metallic [illegible] gold, silver [illegible].

It is [illegible] gold [illegible] under the name of "[illegible]", [illegible] brilliant and permanent [illegible] process [illegible] gilt. There are serious objections to the use of a Liquid Gold Paint for exterior decoration. In the first place, the Bronze Powder, when mixed with the Bronzing Liquid for a certain period, imparts a greenish tinge to the vehicle or diluent.

After being applied, a Gold Paint made in this way is promptly affected by the action of air, loses its brilliancy and quite often turns dark. It also happens that the size which binds the powder to the surface, lacks adhesive power, the consequence being that such gold will peel off or rub off.

In view of these serious objections to the use of Liquid Gold Paints, manufacturers have endeavored to overcome as much as possible the drawbacks already referred to; and although there is a great deal to improve and to be done yet in this direction, there are quite a number of results which seem to have solved, if not entirely, at least partially, the problem of a READY MIXED LIQUID GOLD PAINT fulfilling the following requirements:

1st. A COLORLESS OR WATER WHITE BRONZING LIQUID, VEHICLE OR SIZE, DRYING RAPIDLY BY EVAPORATION.

2nd. A SIZE NOT TURNING GREEN OR BEING AFFECTED BY THE BRONZE POWDER WITH WHICH IT IS MIXED.

3rd. A RESULTING MIXTURE OF SIZE OR BRONZE POWDER, OR IN OTHER WORDS, A GOLD PAINT ADHESIVE TO THE SURFACE, NOT RUBBING ROUGH AFTER BEING DRY, AND DRYING WITH A HIGH GLOSS.

4th. A RESULTING MIXTURE OF GOLD PAINT STANDING REASONABLY WELL THE ACTION OF AIR WITHOUT DARKENING OR LOSING ITS BRILLIANCY.

The market is crowded with worthless bronzing liquids and Gold Paints which hardly could be used for renewing gold frames dimmed by use or for brightening up or beautifying household articles and bric-a-brac; but there are only four brands which fulfill more or less the four requirements above specified.

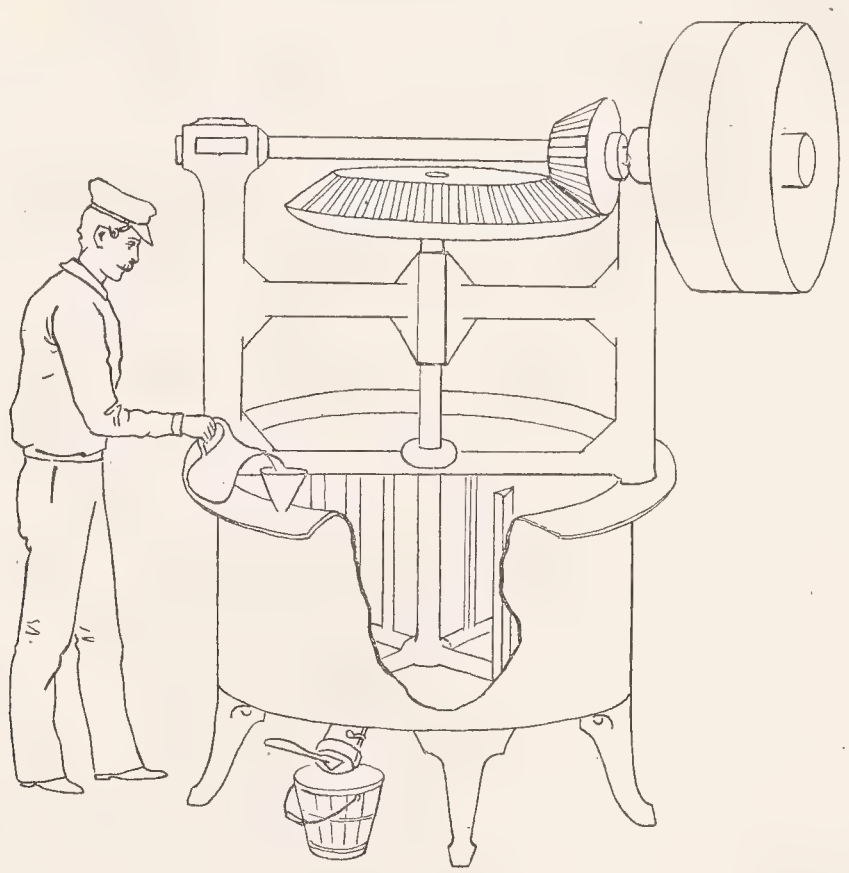
PREPARATION OF THE WATER WHITE SIZE OR BRONZING LIQUID

not turning green,

DRYING RAPIDLY AND STRONGLY ADHESIVE TO THE SURFACE.

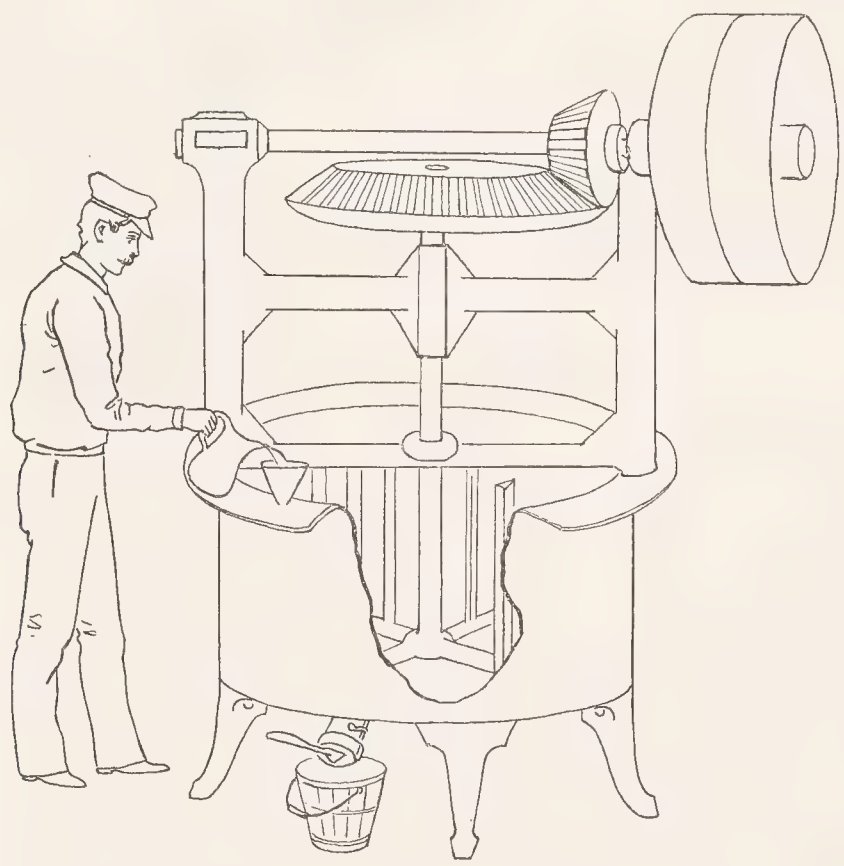
-:-:-:-:-:-:-:-:-

Neither JAPAN, GOLD SIZE nor QUICK DRYING VARNISH diluted with Naphtha or Turpentine is fit for use in the preparation of such BRONZING LIQUID, SIZE or VEHICLE entering into the composition of a GOLD PAINT.



INDIA RUBBER or a solution of PARA RUBBER in Naphtha, and far better yet, a RUBBER CEMENT such as can be bought from manufacturers of Ready Made Rubber Solutions, is the best material that can be used in the preparation of a Bronzing Liquid fulfilling all the requirements already specified. The preparation of a Bronzing Liquid, should be conducted in a cutting mixer as the one above.

The SOLUBILITY OF RUBBER IN TURPENTINE OR NAPHTHA IS WELL KNOWN; however it may be said that India Rubber or Pure Para Rubber cannot be dissolved like Camphor or Rosin by simple immersion or heating with the above solvents. It requires first a mechanical preparation or mingling which disintegrates the Rubber and thus renders it fit for making Rubber solutions. The mingling process requires powerful pieces of machinery, which a paint manufacturer has not generally for this purpose. It is therefore better, instead of buying the Para Rubber, then mingling until it assumes the



consistency of a thick jelly, to get from the market Para Rubber solutions already made, such for instance as the Boston "Diamond" Rubber Cement, the "XXX" Para Rubber Cement of the "PP" brand. The only thing to be done is to dilute them in the above mixer with Benzine in the proportion of 10 gal. of benzine per every gallon of Rubber Cement.

[illegible]

[illegible]

[illegible]

[illegible] 2 to 4 gm. [illegible] Bitter grinding [illegible]. [illegible] 1 to [illegible] of Water [illegible] per every eighteen parts of the bronzing liquid. [illegible] brushes, or mixed together [illegible]. The Bronze Powder [illegible] the bottom of the pot [illegible] with any other [illegible]; and in order to get the Gold Point [illegible], it goes without saying; that the contents of the bottle should be shaken before using.

O T H E R B R O N Z E P A I N T F O R M U L A S

From the analysis of

NUMEROUS BRANDS OF READY-MIXED BRONZE PAINTS BY ELLMAKER.

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A thorough, by-no-means hasty analysis of a large number of Bronze Paints selected from the brands most extensively sold and widely known, enables me to give the following; Durable Black, although not being equal to the Gold Paint obtained from the previous formula, may not fail to be of interest to those who are engaged in the manufacture of this specialty in the paint line.

The Gold, Silver or Bronze Powder used by manufacturers of Bronze Paints, is almost always the same. The only thing that varies is the nature of the Bronzing Liquid, vehicle or diluent and the proportion of metallic powder which it contains.

A solution of SHELLAC in SODA, 25 deg. B., with a very little Gelatine dissolved in it, gives to some manufacturers the DRY-FIRM FINISH used in Gold Paints for BRASS BEDS.

Other Bronzing Liquids are already used for producing the Bronzing Liquid, consists in diluting one part in volume of COPAL VARNISH with two parts of TURPENTINE or NAPHTHA.

Another formula consists in dissolving COERULEUM, ALUMINA GUM or BITTER ALMONDS in a large quantity of TURPENTINE or NAPHTHA.

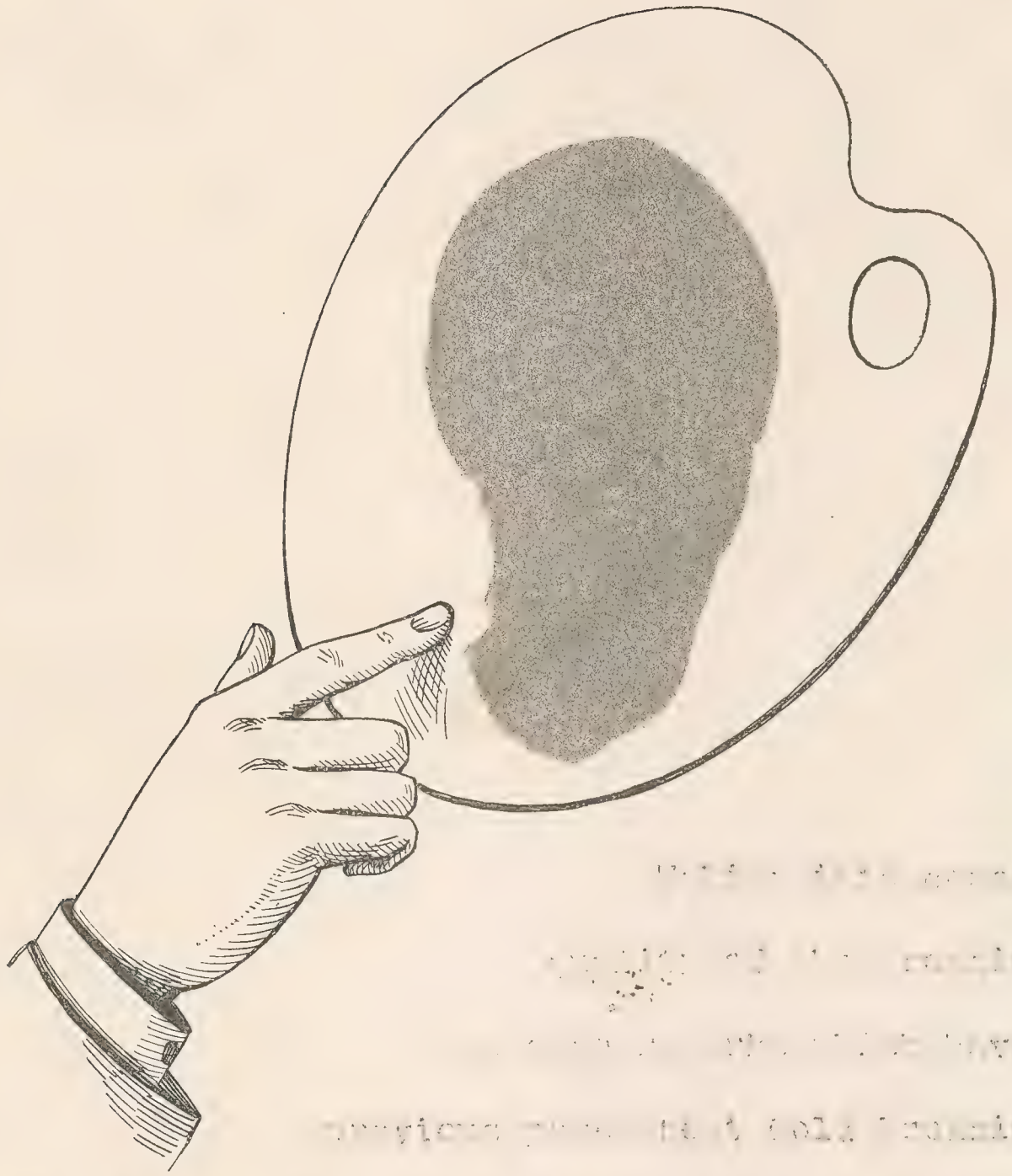
W O L D S R O N Z I N G D E E C T

[illegible]

A GOOD BROWN [illegible] A VERY [illegible] BROWNING POWDER.

-:-:-:-:-:-:-

[illegible] the [illegible] powder used above, [illegible] to spread over the surface, the result obtained may be considered as almost perfect for [illegible] purposes in cases in which large quantities of [illegible] paint have to be applied at the lowest possible cost. [illegible] the [illegible] and the [illegible] of the Bronze Powder be only a [illegible] better, the same browning will accuse a magnificent finish with the very same bronzing liquid.



C O P P E R B R O N Z I N G E F F E C T

obtained from

A GOOD BRONZING LIQUID AND A MORE CRISP BRONZING POWDER.

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The applications of Stove Heaters, Tiled Fires, Decorative Panels, Electrical Appliances, etc., not to mention of many other applications of less importance, afford a large field for the use of Gold, Silver and Bronze Paints of every description. In all cases the bronzing liquid should be prepared according to the instructions already given. As to the bronzing powder, it can be found in the market in a great variety of colours and tints, producing most beautiful metallic effects.

-:-:-:-:-:-:-:-:-

A special Varnish intended for Table Oil Cloth must possess peculiar characteristics which do not exist in the majority of Oil Varnishes or Fat Varnishes. In the first place, a Table Cloth Oil Varnish must be very elastic, so as not to affect the flexibility of the Oil Cloth. It must dry rapidly, and the oxidizing compound or drier used must not affect the lightness of the Oil or Varnish.

In the state of New Jersey, and especially in Trenton, where are located some of the best Oil Cloth factories in the United States. the use of Borate of Manganese Oils, Red Lead, Litharge or Lead Oil and Black Oxide of Manganese Oil, hasbeen discarded on account of the color which they impart to the Varnish and the hardness which is the result of the use of such driers.

Oleate of Lead seems to be the only material which combines the quick drying property with the lightness in color and the elasticity.

As to the Gums, the best proportion to use is 10 lbs. of Almadina Gum or Mineral Rubber, commonly named Potato Rubber, with 90 lbs. of Manila Chips or Dust, in all, 100 lbs. of gum per 6 gals. of Oleate of Lead Oil thinned down with 25 gals. of Camphorated Turpentine or Naphtha. (See formula on the next page).

FORMULA FOR MAKING

L I G H T O I L C L O T H D R I E R.

-:-:-:-:-:-:-:-:-

LINSEED OIL	50 gals.
OLEATE OF LEAD	10 lbs.
CAMPHORATED TURPENTINE	25 gals.

-:-:-:-:-:-:-:-:-

FORMULA FOR MAKING

L I G H T O I L C L O T H V A R N I S H.

-:-:-:-:-:-:-:-:-

	OLEATE OF LEAD OIL, NO. 9 ...	6 gals.
10 lbs.	MINERAL RUBBER	1 gal.
90 lbs.	MANILA CHIPS	5 gals.
	CAMPHORATED TURPENTINE	10 "
	CAMPHORATED NAPHTHA	15 "

The Oleate of Lead Oil, having been prepared as per instructions given in Vol. II, Part No. 1, Item # 90, there is no need to cook Oil and Gum longer than is necessary to incorporate them thoroughly together.

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